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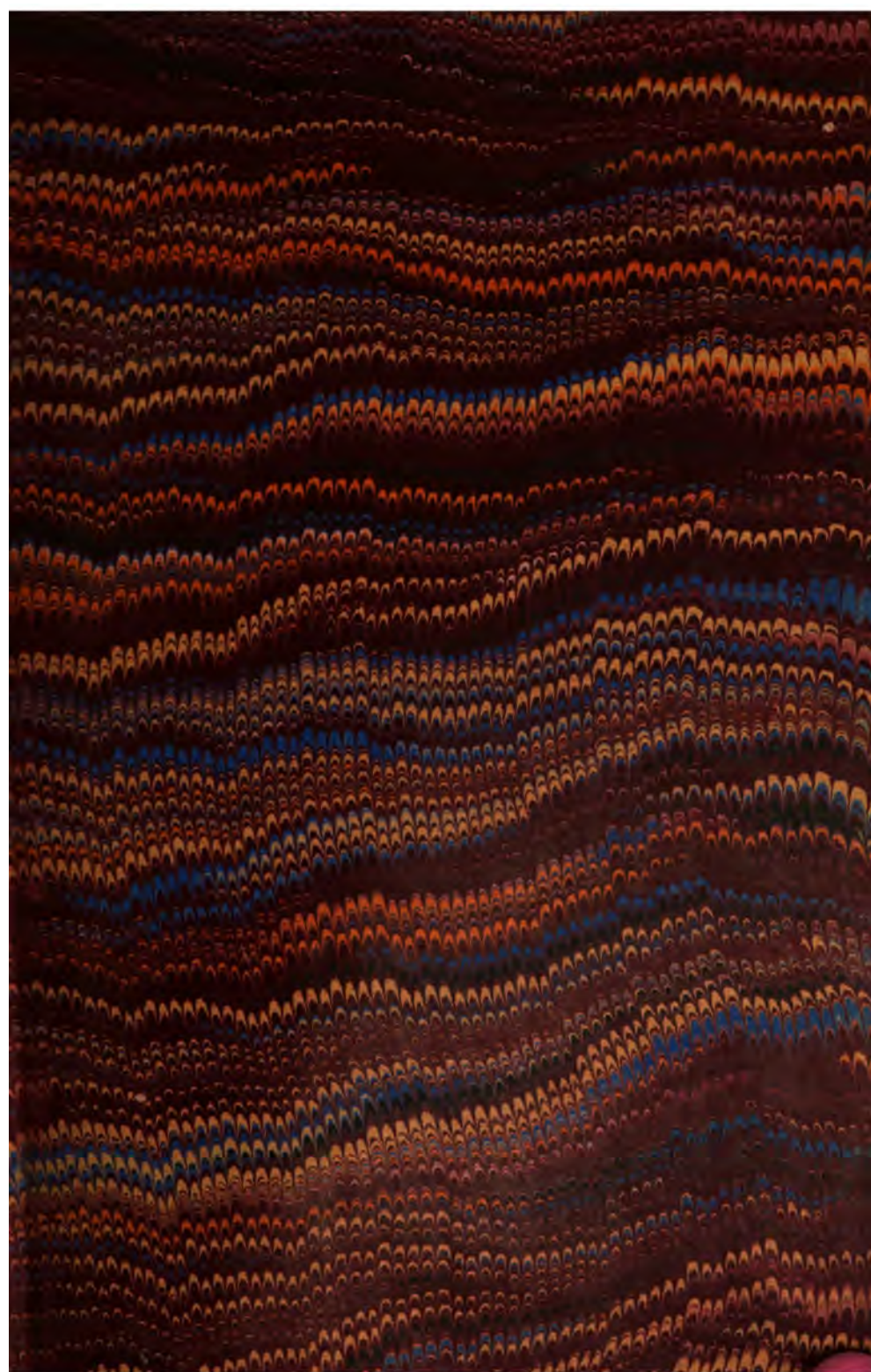
THE GIFT OF
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THE ADAMS MEMORIAL IN TRURO CATHEDRAL.

UNVEILING BY THE BISHOP.

On Saturday afternoon the Bishop of Truro unveiled a mural tablet which has been erected in Truro Cathedral to the memory of the late Professor John Couch Adams, of Cambridge, the virtual discoverer of the planet Neptune, while yet an undergraduate at Cambridge University. The deceased astronomer, whose name will probably rank (as Canon Mason observed in the course of his address at the unveiling ceremony on Saturday) as one of the greatest of the century, was a Cornishman, having been born at Lidcot, near Launceston, in 1819. He proceeded to Cambridge and became senior wrangler in the Mathematical Tripos of 1843. Two years previous he had formed a design of investigating, as soon as possible, after taking his degree, the irregularities of the motion of Uranus, which were then unaccounted for, in order to find whether they were attributable to the action of an undiscovered planet beyond it, and thence, if possible, to determine the elements of its orbit, which, he thought, would probably lead to its discovery. Accordingly, in 1843, he began his investigations and calculations, and in September, 1845, communicated them to Professor Challis, of the Cambridge Observatory. The same results, slightly corrected, he communicated before the middle of the following month to the Astronomer-Royal at Greenwich. These communications were—



Anthony Payne The Cornish Giant
Painted by Sir Godfrey Kneller 1689
by Command of King Charles II
Presented to the
Royal Institution of Cornwall
By Robert Harvey Esq. J.P. 1889

JOURNAL
OF THE
Royal Institution of Cornwall.



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Royal Institution of Cornwall.

71st ANNUAL GENERAL MEETING.

The Annual Meeting was held on November 18th, 1889, at the Rooms of the Institution. In the absence of the President, the Chair was taken by the Rev. W. Iago, B.A., ex-President.

The Secretary reported the following presents to the Museum and gifts to the Library since the publication of the

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Pebble in Granite from Liskeard	
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Highly finished cast of the Spotted Ray, <i>Raja punctata</i> , Day	

Two large framed Oil Paintings of Australian bush life	Major Parkyn, F.G.S.,
Specimen of Fire-backed Pheasant, <i>Explocornus ignitus</i> ,	(Hon. Sec.), Truro.
Lath; Argus Pheasant, <i>Phasianus argus</i> ; Wrinkled	James Osborne,
Hornbill, <i>Anorrhinus corrugatus</i> ; Gibbon Monkey,	
<i>Hylobates</i> ; Slow-paced Lemur, <i>Loris tardigradus</i> ,	
Geoff.; Flying Squirrel, <i>Pteromus</i> , and Black	
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GIFTS TO THE LIBRARY,

Encyclopædia of Cottage, Farm, and Villa Architecture,	Mrs. Sharp,
London, Vols. I and II	
Encyclopædia of Agriculture, London, Vols. I and II...	
Jackson on Agriculture	

Life, its origin and succession, Phillips	
Lexicon Herodoteum	
Clavis Homerica	
Chemical Analysis, Parnell... ..	
Conchologist's Text-book, Brown	
Kennett's Antiquities of Rome... ..	
An Essay on the History of the English Government, Lord John Russell... ..	Mrs. Sharp, Kensington.
Hobbes's Thucydides	
The Pencil of Nature, H. Fox Talbot, Pts. I and II. ...	
Raccolta di Ercolano, di Pompei, e di Staba	
Raccolta de monumenti del Museo Borbonico	
Views in Rome	
The Pictorial Museum of Animated Nature, Knight, Vol. I and II, and many other books	
Portrait of Dr. F. W. P. Jago	Dr. Jago, Saltash.
Grasses of New Zealand (tinted plates)	
Catalogue of the Butterflies of New Zealand (colored plates)	
British Association Reports, 41 Volumes, fully bound...	John D. Enys, F.G.S. New Zealand.
An account of Anglo-Saxon Coins, and Gold and Silver Ornaments found at Trehiddle	
Meteorological Report of New Zealand, 1885... ..	
Pamphlets on the Geology of South Devon & Cornwall	
Pamphlets on the Agriculture of Cornwall, &c.	
The Parliamentary Representation of Cornwall to 1832	The Author, Wm. Prideaux Courtney.
The History of the Yorkshire Geological and Polytech- nic Society	The Society.
Three Views of Truro and St. Mary's Church, by Varley	
A series of Maps and Plans of Cornwall and the Scilly Isles	W. J. Clyma, Truro.
Drawing of Roman Water Wheels discovered at Rio Tinto Mines, Spain	James Osborne, F.G.S., Truro.
Map of Contemplated Improvement of Truro Port ...	
Letters, Remarks, &c., with a view to open an extensive trade in the article of Tin, from the County of Cornwall to India, Persia, and China, 1790	
General View of the Agriculture of the County of Cornwall, G. B. Morgan, 1811	J. H. James, Truro.
Report of Committee as to forming Devon and Cornwall Railway	
Plans for the formation of Harbours of Refuge by Capt. J. N. Taylor, 1840... ..	

Reference Catalogue of Current Literature	Thomas Worth, Truro.
Catalogue of Minerals, Derby Museum	} H. Arnold Bemrose, M.A., Derby.
General description of the Republic of Uruguay	
Revised Guide Book of the Orient Line	} The Consulate General, London. Street & Son.
Progress of Metallurgical Science in the West	
List of Mines worked in 1888 (Official Report)	} The Author, Richd. Pearce, F.G.S., Denver, U.S.
Report by the donor on Metalliferous Mines, 1888	
List of the plans of Mines abandoned, corrected to 30th June, 1889	} Dr. C. Le Neve Foster, Llandudno.
Familiar Letters, by James Howell, 1655	
Gentleman's Magazine, 1741	} C. E. Vivian, Truro.
Abstract of the Weather Records, Liakard, 1864-1889	
Scientific Proceedings of the Royal Dublin Society, Vol. VI., Pts. 3, 4, 5, and 6.	} S. W. Jenkin, Liakard.
Scientific Transactions of the Royal Dublin Society, Pts. II, III, IV, V.	
Monthly Weather Review	} The Society.
Summary and Review of International Meteorological Observations	
Monographs of the U.S. Geological Survey, XIII, XIV.	} The Government of the United States of America.
Atlas of the Quicksilver deposits of the Pacific Slope, accompanying Monograph XIII.	
Bulletins do. do. 48 to 53.	
Annual Report do. do.	
Smithsonian Report	
Ænsidea, by Dr. James Henry, Vols. II, III, and IV, completing the work	} The Trustees of the late Dr. Henry.
Annalen des K. K. Naturhistorischen Hofmuseums	
Bulletins du Comité Géologique, S. Petersbourg	} The Austrian Government.
Supplements du Bulletins du Comité Géologique, S. Petersbourg	
The Pocket Book of the Peninsula and Oriental Steam Navigation Co.	} The Russian Government.
The Castle Line Guide to South Africa	
New South Wales, its History and Resources	} The Company.
Quarterly Returns of Marriages, Births, and Deaths ...	
	Donald, Currie, & Co.
	Government of New South Wales.
	The Registrar General.

BOOKS PURCHASED.

Geological Record, 1880 to 1884 inclusive.
 Monograph of the Palaeontographical Society, 1889.
 Monograph of the Ray Society, 1889.
 The Western Antiquary.
 Symon's Monthly Meteorological Magazine.
 Journal of the Meteorological Society.
 British Rainfall.
 Nature.
 Zoologist.
 Science Gossip.
 Knowledge.
 Times Register of Events, 1888.
 Directory of Truro.
 Journal of the Royal Microscopical Society.
 Observations on the Tin Trade of the Ancients, by Sir Christopher Hawkins.
 A Guide to Mount's Bay and Land's End.

EXCHANGES WITH OTHER SOCIETIES.

Academy of Natural Sciences of Philadelphia	Philadelphia.
Anthropological Institute of Great Britain and Ireland...	London.
Bath Natural History and Antiquarian Field Club ...	Bath.
Belfast Naturalists' Field Club	Belfast.
Berwickshire Naturalists' Club	Cockburnspath.
Birmingham Natural History and Microscopical Society	Birmingham.
Birmingham Philosophical Society	Birmingham.
Boston Society of Natural History	Boston, U.S.
Bristol and Gloucester Archaeological Society	Gloucester.
Bristol Naturalists' Society... ..	Bristol.
British and American Archaeological Society of Rome...	Rome.
Canadian Institute... ..	Toronto.
Colorado Scientific Society	Denver.
Cumberland and Westmoreland Association for the Advancement of Literature and Science	Carlisle.
Department of Mines	Sydney, New South Wales.
Der K. Leop.-Carol. Deutschen Academie du Naturfor- scher	Halle.
Devonshire Association... ..	Tiverton.
Eastbourne Natural History Society... ..	Eastbourne.
Elisha Mitchell Scientific Society	Chapel Hill, U.S.
Essex Field Club	Buckhurst Hill.
Geologists' Association... ..	London.
Geological Society of Edinburgh	Edinburgh.
Geological Society of Glasgow	Glasgow.
Geological Society of London	London.

Greenwich Observatory	Greenwich.
Leeds Philosophical and Literary Society... ..	Leeds.
Liverpool Literary and Philosophical Society... ..	Liverpool.
Liverpool Engineering Society	Liverpool.
Liverpool Naturalists' Field Club	Liverpool.
Liverpool Polytechnic Society	Liverpool.
London and Middlesex Archaeological Society	London.
Manchester Geological Society	Manchester.
Meriden Scientific Association	Meriden, Conn., U.S.
Mining Association and Institute of Cornwall	Tuckingmill.
Mineralogical Society of Great Britain	London.
Natural History Society of Glasgow... ..	Glasgow.
New York Academy of Sciences... ..	New York.
North of England Institute of Mining and Mechanical Engineers	Newcastle-upon-Tyne.
Nova Scotian Institute of Natural Science	Halifax, Nova Scotia, Canada.
Patent Office	London.
Penzance Natural History and Antiquarian Society ..	Penzance.
Philosophical Society of Glasgow	Glasgow.
Plymouth Institution	Plymouth.
Powys-land Club	Welshpool.
Quekett Microscopical Club... ..	London.
Royal Astronomical Society... ..	London.
Royal Cornwall Polytechnic Society	Falmouth.
Royal Dublin Society	Dublin.
Royal Geological Society of Cornwall	Penzance.
Royal Geological Society of Ireland... ..	Dublin.
Royal Historical and Archaeological Society of Ireland	Dublin.
Royal Institution of Great Britain	London.
Royal Irish Academy	Dublin.
Royal Physical Society of Edinburgh	Edinburgh.
Royal Society of Edinburgh	Edinburgh.
Seismological Society of Japan	Yokohama.
Smithsonian Institute	Washington.
Society of Antiquaries of London	London.
Society of Arts	London.
Société Mineralogique de France	Paris.
Somersetshire Archaeological & Natural History Society	Taunton.
Wagner Free Institute of Science	Philadelphia.
Y Cymmrodorion Society	London.
Yorkshire Geological and Polytechnic Society	Halifax.
Zoological Society of London	London.

The Minutes of the last Meeting having been read and confirmed, the Secretary read the following

REPORT OF THE COUNCIL.

The Council of the Royal Institution of Cornwall, in presenting the 71st Annual Report and Balance Sheet, have pleasure in stating that the increased interest on which they congratulated the members last year has in no wise abated, and that the year which has closed has been marked by an unusual interest taken in the welfare of the Institution by members, non-members, and visitors alike.

The Council regret the loss by death, since the last Annual Meeting, of Viscount Falmouth and Mr. Leverton, M.R.C.S.

Viscount Falmouth and his predecessors were associated with this Society from its foundation, and were always consistent supporters of everything which tended to its prosperity. Mr. Leverton was from his early years greatly interested in the work carried on by this Institution, which he fostered to the best of his ability as a member of Council and constant attendant at the Meetings; his familiar figure and genial presence will undoubtedly be long remembered.

The Council are pleased to notice an increase in the number of members; they took occasion in presenting their Report last year to draw attention to the losses the Society had sustained by death and other causes. They are, therefore, this year more than compensated by the addition of several new subscribers; still, they would urge on the members the necessity of further securing the support of their friends, in order that the usefulness of the Society may be more widely extended.

The visitors to the Museum continue to become more numerous; possibly, the many descriptive notices issued by the Curator have had the effect of stirring up public interest in its contents. We have had, during the year, 1,200 more free visitors than last year. There has been a most encouraging increase in the introduction of friends by members—in this class alone the gain has been five-fold, stimulated no doubt by the acquirement of Sir Godfrey Kneller's portrait of Anthony Payne, to which further reference will presently be made.

The Council trust that members will continue to freely use their privilege of introducing their friends. A pleasing feature in the past year has been the introduction, by members, of upper form scholars of schools they were interested in. This concession has been highly prized and frequently taken advantage of, the pupils having shewn very great interest in the exhibits. The Council feel that much good may result from cultivating a regard for the fine collection of objects in the museum, under the guidance of members who are themselves intimate with natural history and kindred subjects. Amongst the classes of visitors to the museum the boys and girls of the higher schools and colleges are on the increase. Several real students have been discovered by the Curator, and every encouragement has been given them to persevere in their work by allowing them free admission at all times to the collections, to personally inspect specimens, and by explaining to them the nature of the study necessary to understand the objects they collect, and the best methods of preserving them. During the past year the collections in all the cases have been cleaned and re-arranged, and the Curator has been further instructed by the Council to affix to a register a duplicate label, with the view to the formation of a complete catalogue of the contents of the Museum.

Admissions to the Museum :—

Free	..	..	..	3,710
By Ticket	..	..	..	269
Payment..	..	..	..	466

4,445

Suggested by the Curator, a new case has been provided for the Geological room, for the purpose of a re-arrangement and classification of the minerals found in Cornwall. To ensure concentration, all the tins, coppers, leads, and other specimens are being placed in family groups. Each specimen has a tablet to itself, and a label affixed fully descriptive of the composition, paragenesis, specific gravity, hardness, and locality of the mineral. In this and in the other mineral cases a pink label will distinguish the Cornish specimens, and a white one those which are not native to the county.

The large inscribed stone from Pozo Almonte, another present from Mr. Robert Harvey, which stood in the basement,

has been removed to the Archæological room upstairs, and placed under a handsome oak and plate-glass case, which has also been presented by the same generous donor. The stone is one of the greatest attractions in the Museum, and the Curator is now engaged in writing an account of it, which it is hoped will be published, with illustrations, for the information and convenience of visitors.

The gifts to the museum and library during the past year have been both numerous and valuable. They include several large donations from Mrs. Sharp, of Kensington, London, amongst which may be mentioned a collection of coins, rare engravings, portions of a pavement from Pompeii, many medals and books. Dr. Jago, of Saltash, has given the original MS. of his English-Cornish Dictionary, also original letters relating to the history of Dolly Pentreath. Mr. Robert Harvey procured at considerable expense the celebrated portrait of Anthony Payne, the Cornish giant, painted by Sir Godfrey Kneller, which he has kindly presented to the Society. This picture, which is hung in the staircase of the museum, has been the means of bringing, as already stated, a very large number of additional visitors to the Institution. It is the intention of the Council to issue a likeness of the valiant giant as a frontispiece to the next number of the Journal. Major Parkyn, F.G.S., Hon. Sec., in the spring of the present year, gave to the Society his valuable collection of minerals got together during his residence at Fieberg in Saxony—many of the specimens are of especial value, and are quite new to the collection in the museum.

Mr. Charles C. Capel, F.R.M.S., of Crays Foot, Kent, has enriched the library by sending a complete set (22 vols.) of the Journal of the Royal Microscopical Society; 21 volumes of the Monthly Microscopical Journal; and the three first volumes of the Quekett Club, altogether 46 volumes of very handsomely bound books. This gift of Mr. Capel's has undoubtedly made the Society's library one of the very best for microscopical reference in the West of England.

Mr. John D. Enys, F.G.S., has presented a complete set of "The Reports of the British Association": "The Butterflies of New Zealand," and "The Grasses of New Zealand." Mr. Enys gave liberally also to the museum, and enriched it with a specimen of "Enysite," a mineral which was wanting to the Society's

collection. Mr. W. P. Courtney kindly sent to the library a copy of his work on "The Parliamentary Representation of Cornwall to 1832." General Lefroy of Lewarne, Liskeard, gave a series of mineral specimens from Tasmania and Western Australia. Mr. Thomas Worth, of Truro, has to be thanked for several gifts, including six volumes of the West Briton newspaper—from 1818 to 1832; Mr. Matthias Dunn for a specimen of old pottery, and an example of the spotted Ray (*Raja punctata*, Day); the discovery of this fish in Britain is due to Mr. Dunn. The Society is indebted to Mr. Edmund Rundle, a member of the Council, for a beautiful cast of this fish. Mr. James Osborne, F.G.S., has enriched the museum with a specimen of the Gibbon Monkey, the Flying Squirrel, the Slow-paced Lemur, and several rare birds, all collected and preserved by him during his residence in Burmah. The Rev. S. Rundle has given a carved stone mould from Tregonning Hill. Mr. Chas. Barrett, the skull of a native of the Maskeylene Islands. Mr. W. Barrett, Chapel House, a copy of the Cornish portion of the Domesday Book. Mr. J. H. James, a map of Truro Port and River. Mr. W. J. Clyma, several engravings of Truro and Maps of the County.

Our Society is again greatly indebted to the Government of the United States. In our endeavour during the past year to make complete the valuable Bulletins issued by its Geographical and Geological Departments, every help has been afforded us, and we have now on our shelves bound sets of its publications as complete as we can possibly expect them to be made. Its other gifts are as numerous and as valuable as ever, and many very interesting acquisitions we owe to its generosity.

From the Royal Society of Edinburgh we have received as complete a set of its Proceedings as it had in print, with the handsome offer to send on such parts as may be reprinted from time to time.

We have also to thank the Royal Dublin Society for the first six volumes of its Scientific Proceedings, and for current parts. The Belfast Naturalists' Field Club for its Annual Reports and Proceedings from 1873 to 1887. The Quekett Microscopic Club for its Journals from 1887 to 1889. The New York Academy of Sciences, for the first five volumes of its

Transactions. The Midland Union of Natural History Societies, for the last three volumes of its organ "The Midland Naturalist;" and the Academy of Natural Sciences of Philadelphia for four volumes of its Proceedings, completing our set to date.

The efforts which have been made to complete certain volumes of Transactions on our shelves have been very successful; fourteen learned Societies which a year ago did not make exchanges with us, now do so to the great benefit of the Institution. The use of the library for reference for visitors outside the county has been freely offered, and advantage has been taken of this on several occasions.

It is with pleasure that the Council see the marked growth of the library; so numerous and extensive have been the presents this year to it, that a new book-case has had to be procured to contain the gifts. More than two hundred volumes have been added since the last annual Meeting. The loans from the library have likewise been more numerous.

During the last twelve months the Curator has furnished to the Press a monthly weather letter, which has excited much interest, and been well received by the public at large. The meteorological observations have had the usual care bestowed on them, and have been supplied to the Registrar General in connection with the Royal Observatory at Greenwich (for comparison with observations taken in different parts of Europe),—to other eminent London observers, and to the Press of the two counties of Cornwall and Devon. In order to further ensure correctness of observation a new maximum thermometer by Negretti and Zambra has been added to the stock of meteorological instruments.

A new number of the Journal has just been issued, which in bulk and appearance is very indicative of the increased activity which is permeating the Society. The editor, Mr. H. Michell Whitley, F.G.S., contributes three papers, "Lanyhorn Castle and its Lords," "Godolphin and the Godolphins," and "Probus Church and Tower." Mr. H. M. Jeffery, F.R.S., a paper on the "Union of the Benefices of Budock and Gluvias." Mr. R. N. Worth, F.G.S., on "The Romans at Tamar Mouth." There are also papers by Mr. N. Whitley, F.R.Met.S., on "The Raised Beach and Cliff Boulders of Falmouth Bay, and of The Drift

Beds on Plymouth Hoe;" Mr. T. Clark, on "Basal Wrecks and Remnants of Extinct Volcanoes on the South-west Coast of Cornwall;" and Mr. E. A. Wunsch, F.G.S., on "The Problem of the Lizard Rocks." The paper on "Oxidised Copper Ores," by Mr. J. H. Collins, F.G.S., closes a series of articles of great interest to Cornishmen. The Council feel that the present number will fully sustain the reputation of the Journal.

The Annual Excursion took place on Tuesday, 27th August, in lovely weather. The members and their friends, over fifty in number, met at St. Austell, where the Church was inspected, after which a start was made for Heligan, the seat of the President, Mr. John Tremayne, where the gardens and grounds were visited. Thence the party had a pleasant drive to Mevagissey and Portmellin. At the former place the Sardine Factory, under the guidance of Mr. Matthias Dunn, and other objects of interest were seen; at the latter place luncheon was served, and the submarine forest was inspected under very favourable circumstances, a trench having been dug to allow of a very minute examination. It was the opinion of many present that the bed was not that of an old forest, but of an alluvial deposit. The excursionists next proceeded to Bodrugan, Gorran Haven, and the Dodman. The return journey was by Caerhays Castle, Caerhays Church, and St. Ewe Church to St. Austell, which was reached at six o'clock, where a handsomely served dinner was partaken of at the "White Hart" Hotel.

The time for awarding the first Henwood gold medal is fast drawing near. The papers which the judges will arbitrate on will include those published in the next number of the Journal, which will appear in the early part of the coming year. The medal having been struck, the appointment of the judges, the methods of ascertaining the merits of the papers, and the manner of award will without delay engage the serious attention of the Council.

It is now just twelve months since the advent of the new Curator, Mr. Henry Crowther, whose appointment has given the greatest satisfaction to the Society, which is to be congratulated on the improved state of the museum generally, and on the increased interest shewn by the members and friends of the Institution, as well as by the public generally. It is with

much pleasure that the Council look forward to a continuation of the work by Mr. Crowther, under whose care and attention they feel sure the interests of the Society will be furthered, and its hold on the public be strengthened more and more.

The Taunton Refractor of $3\frac{1}{4}$ inches aperture was received from Messrs. Cook & Son in February, having been put in thorough repair and furnished with a new object glass. Mr. H. Michell Whitley, in whose hands it has been placed by the Council for astronomical work, has determined to devote it mainly to the study of star colours, taking first the visible stars in these latitudes down to and inclusive of the fifth magnitude. Fair progress has been made in this work, the stars in the following constellations having been examined and their colours registered; Canis Minor, Corona Borealis, Corvus, Delphinus, Equuleus, Leo, Lyra, Sagitta, Serpens, and Triangulum. The colours of a large number of stars in other constellations have also been ascertained. The instrument, with its accessories, has been maintained in good order.

The President, Mr. Tremayne, having served for two years, the Council have great pleasure in proposing that Mr. Edwin Dunkin, F.R.S., late President of the Royal Astronomical Society, be elected President of this Institution for the next two years.

They also propose the election of the following as Vice-Presidents for the ensuing year:—

Dr. Jago, F.R.S.	|	Mr. H. M. Jeffery, F.R.S.
Rev. Canon Moor, M.A.	|	Sir W. W. Smyth, F.R.S.
Mr. John Tremayne.		

As other Members of Council:—

Ven. Archdeacon of Cornwall,	|	Chancellor of the Diocese of
Rev. J. R. Cornish, M.A.	|	Cornwall, Mr. R. M. Paul,
Mr. Howard Fox, F.G.S.	|	M.A.
Rev. W. Iago, B.A.	|	Mr. E. Rundle, F.R.C.S.I.
Mr. Hamilton James.	|	Rev. A. R. Tomlinson, M.A.
Rev. A. H. Malan, M.A.	|	Mr. Robert Tweedy.
	|	Mr. N. Whitley, F.R.Met.S.

Mr. A. C. Willyams, *Treasurer*.

Mr. H. Michell Whitley, F.G.S.,	} <i>Hon. Secs.</i>
Major Parkyn, F.G.S.	

The Council, before concluding their Report, would express most gratefully their sense of obligation to Major Parkyn, the Honorary Secretary, for the constant care and attention he invariably bestows upon all matters connected with the welfare of the Institution. For years past he has acted as the organizer of its meetings, excursions, and local arrangements, a duty requiring considerable forethought and the sacrifice of much time. By his personal exertions, by his gifts, and in a variety of ways he has contributed very materially to its prosperity.

On the motion of Canon Bourke, it was resolved that the Report be received, adopted, and printed.

The following papers were then read:—

“Landowners in Cornwall in the twelfth and thirteenth Centuries.”—W. Sincok.

“The Cornish Chough.”—Rev. A. H. Malan, M.A.

“A Deed of Composition between the Vicar of St. Gluvias and the Burgesses of Penryn, in 1322.”—John D. Enys, F.G.S.

“Recent Archæological Discoveries in Cornwall.”—Rev. W. Iago, B.A.

“On the Mineralogical Composition of the Rocks between the Black Head and Porthalla.”—T. Clark.

A vote of thanks was passed to the Authors of papers and to the Donors to the Museum and Library, and it was resolved that the members named in the Report be the Council for the ensuing year. The Meeting concluded with a vote of thanks to the Chairman.

In the evening a *Conversazione* was held when the following subjects were described by the Rev. W. Iago, who presided:—

“Ancient Rock-Markings near Newquay.”

“The late Excursion in the Dodman district”

“Some Ancient Sculptures on St. Austell Church.”

The Chairman also read a paper on “The Romans in Cornwall,” written by Mr. R. N. Worth, F.G.S.

Some remarks were likewise contributed by the Rev. S. Rundle and others present.

Dr. Arthur C. Williams, Don. Treas., in account with the Royal Institution of Cornwall. Cr.

1888.		1889.		1890.	
July 31st.	1889.	July 31st.	1889.	July 31st.	1889.
To Balance brought forward	...	By Curator	...	...	...
" Annual Subscriptions, Donations, Arrears and Illustration Fund	131 17 0	" W. Newcombe	...	...	...
" H. R. H. The Prince of Wales	...	" Printing, &c.	...	...	...
" Visitors' Fees	11 8 0	" Museum Expenses	...	...	...
" Sale of Journals	4 9 0	" Cook & Son, York, Telescope	...	...	...
" Martyn's Letters	0 3 0	" Cornish Mineral Case	...	...	...
" Transfer from Deposit Account	26 5 0	" Fire Insurance	...	...	...
" Sundries	3 10 5	" Repairs to Building	...	...	...
" Excursion	16 16 0	" Drainage	...	...	...
" H. Michell Whitley, donation towards repairs of Telescope	5 5 0	" Conversation	...	...	...
		" Excursion	...	...	...
		" Nature	...	...	...
		" Palaeontographical Society	...	...	...
		" Ray Society	...	...	...
		" Meteorological Society	...	...	...
		" Western Antiquary	...	...	...
		" British Rainfall	...	...	...
		" Zoologist	...	...	...
		" Taxes	...	...	...
		" Postage, Parcels, &c.	...	...	...
		" Sundries	...	...	...
Balance due to Treasurer	8 0 11				

TABLE No. 1.

Summary of Meteorological Observations at Truro, in Lat. 50° 17' N., Long. 5° 4' W., for the year 1889, from Registers kept at the Royal Institution of Cornwall.

1889.		MONTHLY MEANS OF THE BAROMETER. Cistern 43 feet above mean sea level.																
Month.	Mean pressure corrected to 32 deg. Fahr. at sea level.			Mean of monthly means.	Mean correction for diurnal range.	True mean of monthly means.	Mean force of vapour.	Mean pressure of dry air.	Corrected absolute maximum observed.	Day.	Corrected absolute minimum observed.	Day.	Extreme range for the month.	Mean diurnal range.	Greatest range from 9 a.m. to 9 p.m.	Day.	Greatest range in any consecutive 24 hours.	Between which days it occurred.
	9 a.m.	3 p.m.	9 p.m.															
January	ins. 30.206	ins. 30.169	ins. 30.178	ins. 30.184	in. .004	ins. 30.180	in. .209	ins. 29.972	ins. 30.680	3	ins. 29.478	9	ins. 0.494	in. .141	in. .53	28	in. .56	27 & 28
February	30.088	30.023	29.998	30.019	.003	30.016	.207	29.807	30.716	16	29.593	27	1.123	.145	.34	13	.97	15 & 16
March	30.006	30.027	29.996	30.009	.007	30.002	.219	29.782	30.526	16	29.036	19	1.480	.140	.38	6	.75	19 & 20
April	29.748	29.743	29.726	29.739	.004	29.735	.243	29.467	30.224	19	29.124	20	1.100	.107	.51	8	.37	29 & 30
May	29.795	29.807	29.807	29.803	.003	29.800	.329	29.458	30.070	20	29.474	9	0.596	.055	.19	1	.35	9 & 10
June	30.681	30.026	30.016	30.241	.001	30.240	.381	29.630	30.386	30	29.654	2	0.732	.062	.40	6	.37	3 & 4
July	29.938	29.931	29.937	29.935	.002	29.933	.388	29.513	30.403	1	29.623	9	0.780	.073	.31	10	.29	7 & 8
August	29.920	29.915	29.903	29.913	.004	29.909	.386	29.563	30.294	27	29.361	21	0.933	.093	.27	19	.52	21 & 22
September	30.087	30.012	30.056	30.052	.004	30.048	.382	29.669	30.361	15	29.588	24	0.773	.069	.25	24	.40	23 & 24
October	29.641	29.693	29.728	29.687	.006	29.681	.363	29.438	30.150	24	29.173	19	0.977	.098	.30	17	.69	17 & 18
November	30.211	30.213	30.212	30.212	.004	30.208	.277	29.931	30.544	17	29.683	3	0.861	.084	.39	5	.44	5 & 6
December	30.169	30.175	30.161	30.168	.003	30.165	.213	29.952	30.547	26	29.516	10	1.031	.126	.40	9	.54	19 & 20
Means	30.037	29.978	29.976	29.997	.004	29.993	.291	29.765	30.408		29.442		0.907	.099	.35		.52	

REMARKS.—The Barometer used is a Standard, made by Barrow, and compared with the Standard Barometer at the Royal Observatory, Greenwich, by Mr. Glaisher. The corrections for Index Error +0.008, Capillarity (+0.018), height above sea (43 feet), and temperature, have been applied.

TABLE No. 2

MONTHLY MEANS OF THE THERMOMETER.

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Month.	9 a.m.								3 p.m.								9 p.m.				MASON'S HYGROMETER.								SELF REGISTERING.						ABSOLUTE.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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The Thermometers are placed on the roof of the Royal Institution in a wooden shed, through which the air passes freely. The Standard Wet and Dry Bulbs are by Negretti and Zambra, and have been corrected by Mr Glaisher.

TABLE No. 3.

1888.	Month.	WINDS.																																					
		N.			S.E.			S.			S.W.			W.			N.W.			N.			N.E.			AVERAGE FORCE.													
		h			h			h			h			h			h			h			h			h			h			h							
		d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e	d	s	e					
	January	0	0	0	2	0	2	0	6	8	10	4	3	1	7	2	5	4	8	6	6	7	7	6	7	12	15	14	14	14	14	14	14	14	14	14			
	February	1	2	1	1	1	0	1	0	5	1	1	2	1	10	8	13	5	7	4	4	6	7	20	21	20	21	20	20	20	20	20	20	20	20	20			
	March	0	2	1	2	2	0	0	1	0	9	11	2	1	0	7	6	6	4	8	11	5	2	3	14	15	12	14	14	14	14	14	14	14	14	14	14		
	April	1	0	0	4	3	2	1	0	0	6	7	8	0	0	5	7	7	6	4	3	7	9	10	17	20	15	17	17	17	17	17	17	17	17	17			
	May	0	0	0	3	1	1	2	0	3	8	12	10	1	3	2	9	6	4	4	6	7	4	3	3	15	14	12	14	14	14	14	14	14	14	14	14		
	June	2	3	5	5	4	4	2	4	2	5	5	4	3	0	1	5	4	4	1	3	4	7	7	6	14	12	11	12	12	12	12	12	12	12	12			
	July	0	0	0	2	1	2	4	2	2	7	7		3	2	3	9	10	9	4	6	8	2	3	1	16	14	12	14	14	14	14	14	14	14	14			
	August	0	0	1	2	2	0	1	1	2	8	7	5	7	6	8	8	9	9	3	4	3	2	1	3	20	18	16	18	18	18	18	18	18	18	18			
	September	2	2	3	6	6	8	4	4	5	3	3	1	3	1	1	3	8	8	5	1	1	3	5	3	20	17	16	18	18	18	18	18	18	18	18			
	October	0	0	0	3	3	3	1	0	0	4	7	7	2	1	2	15	13	14	0	1	2	6	6	3	21	20	21	21	21	21	21	21	21	21	21			
	November	0	0	0	5	5	7	0	1	0	10	9	10	0	0	0	5	5	5	1	0	2	9	10	6	17	16	19	17	17	17	17	17	17	17	17			
	December	0	0	0	4	3	3	0	0	4	9	7	5	3	4	3	2	2	2	4	5	5	9	10	9	17	15	18	17	17	17	17	17	17	17	17			
	Total	6	9	11	39	31	33	15	16	18	81	82	78	29	23	22	35	80	86	41	53	56	64	69	60	203	197	186	196	196	196	196	196	196	196	196			
	Means	8.7			34.3			16.3			80.3			24.7			33.7			50.0			64.3			17			16	15	16	16	16	16	16	16	16	16	16

The force of the Wind is estimated on a scale from 0 to 5, from calm to violent storm.

TABLE 4.

1889.

WEATHER.

Month.	AVERAGE CLOUDINESS.				RAINFALL.					Mean weight of vapour in a cubic foot of air.	Mean additional weight required for saturation of the air.	Mean humidity of atmosphere.	Mean elastic force of vapour.	Mean weight in grains of a cubic foot of air.	SUN.			Dry.	Wet.	REMARKS.	
	Rainfall in inches.			No. of days in which rain fell.	Greatest fall in 24 hours.	Date.	Truro.	In.	Grain.						Blue.	Gleam.	Cloud.				
	9 a.m.	3 p.m.	9 p.m.																		Mean.
January	5.4	5.6	4.8	5.3	2.71	14	0.08	8	2.59	0.94	71	2.06	554.9	15	5	42	65	298	Fog 6, 17, 16, 28, 28. Hall 6, 10, 11, 12, 13, 24, 25, 26, 27, 28. Hall 1, 2, 3, 9, 11, 12. Snow 10, 11, 12, 24.		
February	6.0	5.2	4.8	5.3	2.83	19	0.40	13	2.80	0.88	71	2.01	552.4	21	3	32	49	355	Frost 2, 4, 6, 9, 10, 11, 12, 13, 24, 25, 26, 27, 28. Hall 1, 2, 3, 9, 11, 12. Snow 10, 11, 12, 24.		
March	5.1	4.6	5.2	4.9	4.74	19	0.83	4	2.48	1.08	72	2.14	550.3	26	3	33	69	24	Frost 1, 2, 3, 6, 11, 12, 20, 22, 23, 28. Snow 1, 2, 3. Remarkable Rain 4, 11, 12, 24.		
April	5.3	4.7	5.1	5.0	2.17	20	0.39	3	2.65	1.44	67	2.41	540.6	30	4	26	68	222	Frost 6, 8, 10, 12, 16. Hall 7, 22, 24. Remarkable Rain 17.		
May	5.0	4.5	5.2	4.9	3.61	18	0.90	17	3.65	1.80	75	2.92	535.2	38	4	20	68	225	Remarkable Rain 17.		
June	4.1	3.8	3.9	3.9	0.92	10	0.50	19	4.09	1.97	67	3.78	536.9	44	8	8	82	8	Remarkable Rain 7.		
July	5.2	4.8	5.8	5.3	3.32	17	0.78	7	4.17	2.13	67	3.86	530.3	32	9	21	74	119	Remarkable Rain 7.		
August	5.5	5.1	5.7	5.4	2.92	22	0.45	2	4.14	2.10	67	3.81	530.0	32	9	21	69	24	Remarkable Rain 7.		
September	4.7	4.9	5.5	5.0	1.17	12	0.50	23	4.11	1.73	71	3.73	534.5	33	9	18	74	16	Frost 14, 25. Gale 6. Fog 20. Remarkable Rain 16.		
October	5.2	6.0	5.3	5.5	5.42	26	1.36	18	2.87	1.56	64	2.59	537.2	19	9	34	59	31	Fog 4, 6, 7. Frost 4, 27, 28. Snow 27. Gale 24. Hall 1, 2, 7.		
November	6.8	6.5	7.3	6.9	3.42	16	0.80	24	3.01	1.29	68	2.71	547.4	17	8	35	63	27	Frost 5, 6, 9, 12, 13, 14, 16, 20, 26, 31. Fog 13, 14, 18.		
December	5.9	6.4	6.4	6.2	4.16	18	0.82	18	2.39	1.19	67	2.07	553.2	31	8	23	66	27	Frost 5, 6, 9, 12, 13, 14, 16, 20, 26, 31. Fog 13, 14, 18.		
Mean	5.3	5.2	5.4	5.3	37.39	18	0.70	18	3.19	1.46	69	2.64	542.0	28.1	6.6	26.1	70.5	24.1			

Cloudiness is estimated by dividing the sky into ten parts, and noting how many of these are obscured. The rain gauge at Truro is placed on the flat roof of the Royal Institution, at about 40 feet from the ground. Glean is recorded when the sun's disk is visible through a film of cloud.

THE ANNUAL EXCURSION.

The Annual Excursion took place on Tuesday, 27th August, when the Dodman District was visited.

The Excursionists from East and West met at St. Austell, where the fine old church was visited, the verger, Mr. George Collins, pointing out the various objects of interest. Over the porch is a pelican carved in local stone; the old pelican, which used to stand over the door, being now in the Truro Museum. The church was restored in 1870, and contains a monument on the south wall to Samuel Drew, one of the historians of Cornwall. The chancel and south chapel were built towards the end of the 13th century, and the remainder during the 15th and 16th centuries. The tower is a handsome structure, and is ornamented with several niched statues, and grotesque and other carvings. It is said to be the second highest tower in Cornwall, being nearly 100 feet high. The tower has a mediæval 24-hour clock face, the machinery of which cannot be traced. There is a curious Norman font in the church, which is in a very good state of preservation, and there are also some interesting specimens of carved oak to be seen. Shortly after nine o'clock the party took to the four carriages which were supplied by Mr. Lukes, of the White Hart Hotel, and after a delightful drive, the extensive grounds of Heligan, the residence of the president of the Institution (Mr. John Tremayne), were reached. The drive to the house is about two miles long, and is a magnificent one. On either side are huge masses of rhododendrons and other plants, trees, and shrubs. The ancient house has given place to a modern building, and here, in the absence of Mr. and the Hon. Mrs. Tremayne, the party were received by Mr. Gillard, the home steward, who very kindly conducted them over a portion of the grounds.

Heligan was then left, and Mevagissey was reached just before eleven o'clock. A move was at once made to the Cornish Sardine Factory, where the party were met by Mr. Matthias

Dunn, who conducted them over the establishment. The interesting process of preparing the pilchards for the markets as Cornish sardines was witnessed. The fish are first of all laid on the floors and cleaned by the girls. They are then salted, grilled, packed in tin boxes, oiled, and soldered down. They are then boiled again while in the boxes, after which they are ready for the market. The most difficult part of the process is the soldering of the boxes, for should the smallest aperture be left in the box when finished the fish spoil. About 3,000 boxes of sardines a day are turned out here. The season extends from July to January, and the other six months in the year are mainly occupied in preparing mackerel and mushrooms in tins for distant markets. London is the principal market to which they are sent, a special arrangement is entered into with the railway company for the transit of the sardines. Last year no fewer than twenty tons of mushrooms were prepared in casks at the factory, and no less than about 100 persons are there employed. The tins are all made on the premises, and the soldering process affords employment to 12 men. The business was originally started by Messrs. Fox, of Falmouth, and Mr. C. E. Fryer, assistant-inspector of fisheries, but was taken over some years ago by Mr. J. T. Morton, of London. It has been largely developed, and is one of the principal industries of the neighbourhood. After an inspection of this establishment the party moved to the harbour, but the effluvium which assailed their olfactory organs was so objectionable that they beat a hasty retreat, and proceeded to Portmellin. Before leaving Mevagissey behind, however, it was noticed that the two new piers were nearing completion. These will give very much more harbour space, and will protect the boats in the inner harbour in rough weather. The erection of these piers (which were sadly needed) was one result of the harbours of refuge movement, the money being borrowed from the Public Works Loan Commissioners at $3\frac{1}{4}$ per cent. The work will, it is said, involve an outlay of £20,000. Proceeding on foot to Portmellin, some of the most charming and beautiful views were obtained. Portmellin reached, lunch was served, after which the following paper on "The Black Head and its surroundings," prepared by Mr. Matthias Dunn, was read by the Rev. W. Iago :—

The geologist will find at the Black Head that interesting rock, green elvan or porphyry. It also occurs in the two headlands to the west, viz., Roundezvous and Van. Close by there is that fine vein of freestone, known as Pentewan stone. St. Austell Church and tower and Mevagissey font are supposed to have been formed from stones of this vein. To the north of the Black Head are the slate quarries which supplied St. Austell and Mevagissey with slate for their houses before Delabole came to the front. In the Black Head haven (or Hoan, as the fishermen calls it) there is a dull white stone, much like vitrified freestone, and not far from it a vein of stone with which I am unacquainted. To the antiquary we can show the Giant's Heaps. The legend of them does not appear in Hunt's collection of the romances and drolls of the West of England. The Giant, it is said, raised the heaps in lifting his spade out of the ground, when about to throw his spadeful of earth across the bay to the Gribbin Headland. These mounds are evidently ancient fortifications, and near the edge of the sea in the haven is a continuation of the rampart. About half-a-mile to the north of the Black Head is Rope-hoon—once an old pilchard fishery station. At spring tides, low water, are to be seen the remains of the old pier—and in the cliffs the remains of the fish cellars. About half-a-mile west of the Black Head is another old fishing station, called Hallelean. Around the cove are the remains of its old pier, and in the valley those of several large fish cellars. Old fishermen have told me that the meaning of this name is "haul in!" inferring that it was the grand spot where the seines with pilchards were "hauled in" on the beach. "Hal" has various meanings in Cornish names. Sometimes it means a salt marsh or moor, in other instances a hill. It is also connected with the verb to hail, howl, call, or shout. It is also Cornish for haul, to drag or pull in. As to Llean, Couch (and, before him, Dr. Borlase) stated that it was the old Cornish name for pilchard. "Hallelean" may, therefore, have signified "haul pilchard," but the derivation of the name should be further tested. At the head of the valley is the decayed village of Trenarren. The old piers and cellars are plentiful along the Cornish coast from Plymouth to the Dodman, Dudman, or Deadman, as the headland is called. Couch calls the cellars "fish palaces," and Mr. Howard Fox, of Falmouth, states that when visiting the old pilchard cellars on the coast of Ireland, he found that the inhabitants there called them "palaces." In the reign of Queen Elizabeth, Hawkins and Drake held commissions from the Queen to settle disputes between the forestallers and fish curers in the cliffs of Cornwall. Most probably the fishing stations in and near Mevagissey formed part of the district under their control. With the introduction of the present Dungarvan pilchard seine into Cornwall from Ireland, which took place in the reign of James I., these cliff cellars seem to have declined. At Portmellin the sand is lightly strewn on the submerged forest.

After the reading of the paper, what is commonly known as the submarine forest was examined and commented on, and the

opinion of some was that the deposit was alluvial, and washed down from the hills. The party then proceeded up Bodrugan Hill, and at the top Bodrugan Farm, formerly an old manor house, was visited. It was intended to go to see the place of Sir Henry de Bodrugan's leap, but time would not permit, and, the brakes having arrived, the party were driven to Gorran Haven, where the Rev. C. R. Sowell drew attention to the new pier which has been erected by Mr. J. C. Williams, of Caerhays Castle, at the cost of several thousands of pounds. The pier stands pretty nearly on the site of the ancient pier, which was built at the end of the last century. The shelter is now such that the fishermen experience no trouble with their boats, as was previously the case. Mr. Sowell also called attention to the fine cliffs, and then led the party to an ancient chapel for fishermen which stands in the village. It was built originally, it is believed, about the year 1540. The style is Late Perpendicular, and years ago, when Mr. Sowell came there, it was in a very dilapidated condition, and was utilised as a store for crab-pots, &c. Money, however, was obtained through the efforts of Mr. Sowell, and the chapel was restored, at a cost of between £500 and £600. As far as possible the old tracery has been preserved. The carriages were again occupied, and after another charming drive past Gorran Church the Dodman was reached. Mr. Sowell here gave some interesting details as to the neighbourhood, and the Rev. W. Iago read a paper, written by Mr. Whitley. From the Dodman, or as it is commonly known "the Deadman's Point," a magnificent view of coast and sea was obtained, and a couple of men-of-war were observed to the westward, including the flagship "Hercules." This great headland (one of the boldest in the English Channel) with its bulwark and legend of the giant's work and death, was the southernmost and turning point of the excursion. The view from this headland, which is 379 feet high, extends from the Rame Head and the Eddystone Lighthouse on the east, to the Black Head, near the Lizard, on the west, with all the intervening coast.

On the return journey, by permission of Mr. J. C. Williams, the carriages were driven through the beautiful grounds of Caerhays Castle. The residence is near the site of the ancient mansion, and was built in its present style from designs by

Nash, the architect of Buckingham Palace. In 1869, about 2,000 Roman coins, small brass, of the 3rd century, were discovered buried in a tin jug in the Caerhays Valley. Thirty of them were presented to the Museum at Truro. On the way to St. Austell the church of St. Michael Caerhays, one of the prettiest country churches in Cornwall, was visited. Here was to be seen much that was interesting, including monuments to members of the Trevanion family, and a small sword used by Sir Hugh Trevanion at Boaworth Field; also what has been supposed to be a leper's window. The church was restored by Mr. J. O. Williams in 1883. A short stay was also made at St. Ewe, and the church inspected. St. Austell was reached shortly after six o'clock. Undoubtedly the success of the day's proceedings was mainly due to the indefatigable and courteous hon. sec. (Major Parkyn), and those who worked so cordially with him.

THE ORNAMENT ON THE EARLY CROSSES OF CORNWALL.

BY ARTHUR G. LANGDON.

Although much has been written on nearly every branch of archæological interest relating to Cornwall, it is a remarkable fact that until the reading of my paper at the British Archæological Association, in March, 1889, on "The Celtic Ornament on the Crosses of Cornwall,"* the subject of the ornamentation on our beautiful monuments had never been dealt with separately. Indeed, with the exception of the Rev. W. Iago's valuable notices on some of the inscribed stones and crosses, and the less important contributions from one or two others, the interesting matter in connection with the early Christian monuments of Cornwall, does not appear to have been very much considered or illustrated in the *Journal of the Royal Institution*, in which, of all others, such information might be reasonably looked for.

This is the more noticeable when we consider that Cornwall possesses a larger number, and a greater variety than any other county of these curious—and in many instances beautiful—crosses, made additionally interesting, not only on account of the evidence they afford of the rude art produced by our ancestors, but also from their association with perhaps the earliest introduction of Christianity into England.

With the object in view of eventually publishing a work on these crosses, I have for some time past been engaged (when opportunity afforded), in forming a collection of measured drawings embracing the several varieties, and in making a special study of the sculptured crosses.

Having completed a series of the latter, I have been enabled to arrange an analysis of the patterns, side by side with corresponding examples occurring in Great Britain and Ireland. The task though not an easy one, proved to be extremely interesting, and the paper embodying the result has just appeared in the *Journal of the Association* already referred

* *Journal Brit. Arch. Assoc.*, Vol. XLIV, Part 4 (1888), p. 301.

to, by the kind permission of whose Council I am allowed to make use of some of the blocks to illustrate this paper.

It is obvious, that to do justice to this subject, illustrations should be given of all the ornamented crosses, but this I regret is not practicable, because the expense naturally entailed would be too considerable. I have, however, from time to time, illustrated nearly all the best Celtic examples, as well as some of those crosses with incised work upon them, references to which may be seen in the foot notes attached to the lists of the stones.

The plates accompanying this paper, are the first correct representations of Cornish crosses with their ornament. The cross shafts of S. Neot and Water Pit Down—both lately re-erected,—and the cross in Merther Uny old churchyard, hitherto unpublished, as well as complete drawings of the other crosses, shewing all four sides, appear here for the first time.

The number and variety of the ornamented stones may occasion some surprise, as was the case when, at a meeting of the British Archæological Association, I exhibited about a hundred drawings of different crosses, inscribed stones, &c., illustrative of a paper written in conjunction with Mr. J. Romilly Allen, F.S.A. (Scot.), on "The Early Christian Monuments of Cornwall." Some incredulity was then felt as to their being all from Cornwall, and I had to explain, that not only was that so, but that the examples then brought before the Association, represented only about *one-third of the whole number known to exist!*

I may here mention, that I now have considerably over two hundred complete drawings of different crosses, all of which I measured and drew to scale on the spot, and obtained the ornament (with one or two exceptions) by means of rubbings I had taken, which were afterwards reduced to scale by photography, so that accuracy is insured.

It will only be necessary here to touch on a few historical points connected with the subject. I shall therefore endeavour to describe and classify the ornamental details as fully as possible. For convenience of reference, the paper is divided into four parts, viz.: (1) Celtic ornament, (2) Incised ornament, (3) Miscellaneous ornament. Two typical examples of each will

be described, concluding with analyses of the ornament, in order to illustrate the different characteristics. Part 4 contains paragraphs on subjects immediately connected with the ornament.

In dealing with Part I, on Celtic ornament, I have found it necessary to quote occasionally from the original paper, to which this branch of our subject was confined, but different examples will be described. Parts II and III have been specially prepared, in order to complete a subject, the desirability of which, you are aware, was suggested in his opening address, by your President of the jubilee year.

PART I.

CELTIC ORNAMENT.

The 28 stones named in the following list, are all decorated with the same kind of Celtic patterns, which are found on the crosses of Ireland, Scotland, and Wales, and are also used in the illuminations of the Hiberno Saxon MSS of the 8th, 9th, and 10th centuries.

The localities where these crosses exist, are as follows:—

(a) *Complete with Head and Shaft.*

PARISH.		PLACE.
Cardynham	..	In churchyard. ¹
Lanhydrock	..	In churchyard.
Lanivet	..	In churchyard (2).
Mawgan in Pyder	..	Lanherne.*
Perranzabuloe	..	On Perran sands (indistinct remains only).
Phillack	..	In churchyard ⁷
Quethiock	..	In churchyard ⁸
St. Neot	..	"Four-hole Cross," Temple Moor. ⁴
St. Teath	..	In cemetery. ⁵
Sancreed (2)	..	In churchyard. ⁸
		By vicarage gate. ⁹
Tintagel	..	Trevena. ^{4†}

(1, 2, 3, 4, 5, 6). Illustrated in "The Builder," 30th March, 1889.

(7, 8, 9). Illustrated in Journal Brit. Arch. Assoc., Vol. XLIV, Part 4 (1888) frontispiece.

* Ibid. Vol. XLV, Part 4 (1889). † Ibid, p. 312.

(b). Head only, or with portion of Shaft.

Padstow (2)	..	Prideaux place ¹ In Dr. Marley's garden.
St. Breage	..	In churchyard.
St. Breward	..	National Schools.
St. Columb Major	..	In churchyard. ²
St. Minver	..	In St. Michael's churchyard.

(c). Shaft only.

Gulval	..	..	In churchyard.
Minster	..	..	On Water Pit Down.
St. Blazey	..	..	Biscovey.
St. Cleer	..	..	Near Redgate (2) ⁴
St. Erth	..	..	In churchyard. ³
St. Just in Penwith	..	..	In church (N. wall).
St. Neot	In churchyard.

(d). Part of Shaft and Base only.

Padstow	In churchyard.
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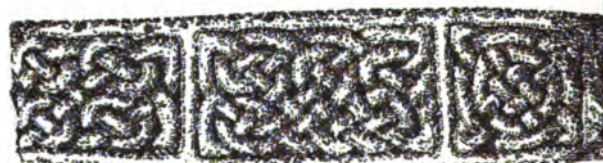
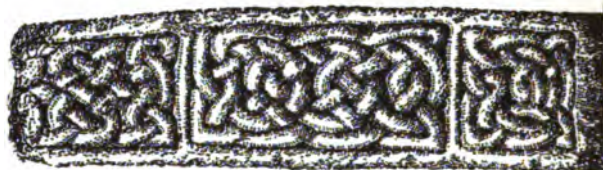
In addition to the sculptured crosses just given, there are two inscribed altar slabs very similar to each other, with square key pattern borders and incised crosses within. They are both in the parish of Camborne, one is preserved under the Communion table in St. Martin's Church,⁵ and the other is at Pendarves; the latter was converted into the base for a sundial, a gnomon being inserted in it by the owner.

There is also a beautiful recumbent, or coped tomb in Lanivet churchyard, outside the south aisle, which is covered with key pattern ornament on the sides and top, the ends are decorated with interlaced work. These additional stones are not actually *crosses*, but they must not be omitted on that account, as they are only monuments of a different description, decorated with the same kind of ornament as the crosses.

Two of the foregoing examples contained in the list will now be described.

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- (1). Illustrated in "The Builder," 30th March, 1889.
 - (2). Illustrated in Journal Brit. Arch. Assoc. Vol. XLIV, Part 4 (1888), p. 324.
 - (3). Ibid, p. 313. (4). Ibid, Vol. XLV, Part 4 (1889), pp. 325-6.
 - (5). Journal Archæologia Cambrensis, p. 356, Oct., 1889.

S. Neot, in churchyard.



John Dingley
1904
3 May 29

*THE CROSS SHAFT IN S. NEOT'S CHURCHYARD.—**Plate 1.*

St. Neot, in the deanery of West, is 6 miles N.W. of Liskeard, and 3 miles N.W. of Doublebois station on the Great Western Railway.

For several years this beautiful granite shaft had lain outside the church against the south aisle wall, but in July, 1889, it was moved out, and erected on St. Neot's stone¹ in the churchyard. This stone is situated opposite to the south porch, and 30 feet from it, and appears to be part of the base of a cross, as there is a portion of the mortice remaining on the south side, the rest of that side being broken off.

This shaft is undoubtedly the best example, in granite, of interlaced work to be found in Cornwall, the patterns are well designed and well executed, the stone itself being in an excellent state of preservation. As a proof of the work being good, it will be seen that all the cords of the interlaced work lap over and under each other regularly, as they always do in good Celtic work.

There is an entasis on the shaft which has beaded angles, and each face is divided into three panels by beads carried round nearly horizontally. The bottom panels are square on the broadsides, but as the shaft is an irregular parallelogram on plan, it causes them to be elongated on the narrow sides. The middle panel is longest, then probably the upper one, but the top of the shaft has been broken, so it is impossible to say what its original height was. There may be a large piece missing, or perhaps only a small portion might have been knocked off in order to make it suitable for some purpose. The tenon has also been broken off.

The dimensions are—height, 6 feet 9 inches; widths, at the bottom, 1 foot 8 inches, and 1 foot 9½ inches, and 16 inches thick; at the top, 1 foot 7 inches; and 14 inches, and 17 inches thick. All four sides are deeply sculptured as follows:

¹ Tradition says that St. Neot was so very short in stature that he was unable to reach up to the keyhole of the door, and it was upon this stone he used to stand and throw the key into the keyhole, whereupon the door opened!

E. Side. All three panels are filled with broken plaitwork; at the bottom two elliptical rings are introduced to fill up the corners. In the middle is an instance of S-shaped knotwork. The diagonal treatment of the middle band in this beautiful example is, as far as I have been able to ascertain, unique.

N. Side. At the bottom is a knot formed by two elliptical rings crossing diagonally, combined with two concentric circles all interlaced. This design occurs also on the shaft in the church of St. Just-in-Penwith. In the middle is a fine specimen of irregular broken plaitwork, at the top we have the only example in Cornwall of the pattern known as "plaits and rings," of which there is an instance in Devonshire on the N.W. face of the famous Copplestone Cross near Crediton. The cross is mentioned in a charter of king Edgar in H.M. Record Office, dated A.D. 974.

W. Side. All three panels are filled with a regular eight-cord plait.

S. Side. At the bottom is a panel of irregular broken plaitwork with an elliptical ring to fill the lower corner; in the middle, another very good example of broken plaitwork, and although somewhat similar to that on the reverse face, it will be seen that the rings in this case are not separated, but joined together like the figure ∞ in a horizontal position.

THE CROSS SHAFT ON WATER PIT DOWN,¹ MINSTER.—

Plate 2.

Water Pit Down is in the parish of Minster, and deanery of Trigg Minor, situated about 4 miles N. of Camelford, and 17 from Launceston railway station.

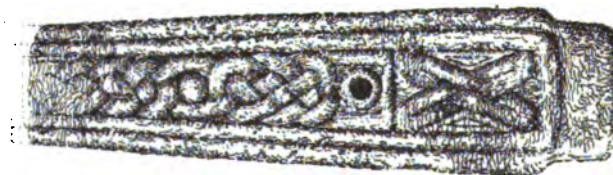
This granite shaft once more stands in its original base, *in situ* by the side of the road from Tintagel to Warbstow. Some 30 years ago it was taken down to Trekeek farm, about half-a-mile from its present position, and there utilised as the pivot stone of a thrashing machine, in which place it remained up to June of the present year (1889), when by, and at the expense of Col. S. G. Bake of Camelford, it was removed and re-erected. The worn and mutilated condition of some parts of this monu-

¹ The drawing of three sides was made while it was at Trekeek.

On Water Pit Down, Minster.



S

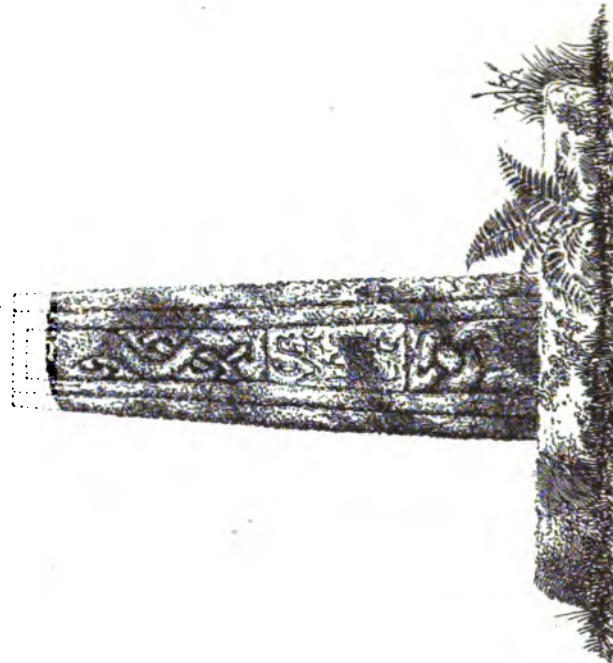


E

As at Trekeck Farm.



N



W.

As fixed in the old base in situ.

Fig. 27

John Lubbock
1862-19

PLATE 2. STONE CARVINGS. &c. &c.

ment is not to be wondered at, when we consider what it has undergone, during so long a period.

It is not, however, nearly so good a specimen of Celtic art as that at St. Neot, for the ornament generally is of a debased character, but since most of the work in Cornwall is of this description, I have for this reason selected it as a typical example of the predominating style.

The shaft has entasis, and the angles are beaded, the front and back having a second bead within. The top has been broken, but not to a great extent, as most of the socket for the head remains. By completing the pattern on the N. side (shown on the drawing by the dotted lines), we arrive at a very fair idea of the original height of the shaft. A tenon¹ is worked at the bottom, and a roughly squared block of granite forms the base. Unfortunately, like the St. Neot cross, the head is missing, and I venture to differ from Sir John Maclean² in thinking that the head is now mounted on the modern shaft in Lesnewth churchyard. A head for this description of monument would, like kindred specimens, be "four-holed."

The dimensions are as follows:—Height including tenon, 7 feet 10 inches; width of shaft above tenon, 2 feet 3 in., tapering to 1 foot 7 in. at the top; thickness, 11 in. at the bottom, tapering slightly upwards. All four sides are divided into panels, but without a separating bead between them, and are sculptured as follows:—

S. Side. This is divided into two unequal panels, the lower one being carried to within about 1 foot of the top, and containing a serpentine band similar to the examples at Lanherne and Sancreed; but, instead of the triquetra knots in the spandrels, a long kind of leaf is introduced, which nearly fills them. They are very flat in execution, and do not appear to have been finished. The markings on the top panel are not distinguishable.

E. Front. This is divided into two panels; at the bottom, two flat oval rings placed crosswise and interlaced, and the side spandrels panelled. Above this, a panel of irregular broken

¹ Compare this with the shaft in Gulval churchyard, lately erected upside down.

² Deanery of Trigg Minor, Vol. I, p. 586.

plaitwork, with spaces left, the bottom one finished square. In the middle of each space is a plain boss, level with the interlaced work, and it was into the lowest of these that the $2\frac{1}{2}$ in. iron bar was inserted for supporting the gear of the thrashing machine, when the shaft formed the pivot stone.

N. Side. This is in the best state of preservation, the ornament is much bolder and not so worn as on the other sides. It is also divided into two panels of unequal height, the lower one is considerably longer, and contains foliated scroll work, which is quite distinct except at the extreme end. The upper pane has some bold diagonal key pattern ornament, which looks really more like a square twist.

W. Front. We come now to the most interesting side, the one which was on the ground, and consequently hidden from view for so many years. My surmise that it was probably inscribed has proved correct.

There are three panels on this side; at the bottom a piece of twist and ring pattern, the upper portion being very distinct, but that below worn away. The middle panel is inscribed, but until further investigations have been carried out, and the true reading ascertained, the following notes must not be accepted as final.

I sent the rubbing down to the Rev. W. Iago, who deciphered most of the letters, the chief difficulties lie in the third or middle line, this is what they *look* like,

C R
V X
I H S ? I F S, or I R S
V R
O C
C R U X I H S U R O C

The C, R, V, X, & O are quite plain, but the other letters are much worn. The middle line may possibly represent the three Greek characters, which form the ordinary abbreviation for the name of JESUS. According to some authorities they may stand for the name of the man who erected the cross, but the former interpretation appears to me the more likely. The IHS so frequently found as a religious emblem in the present day (representing the Latin words Iesus Hominum Salvator) was not used in the earlier ages of Christianity.

Mr. Iago further points out that the name "Urochani" is found on the inscribed stone at Welltown, Cardynham.

At the top of the shaft is a panel of Stafford knotwork with serpentine band as before described, but too much worn to say how it is finished. This is the only case where this pattern occurs in Cornwall on the *front* of a cross; in the other examples it exists only on the sides.

Having now given some account of the Celtic ornament found in Cornwall, it would be well here to devote a short time to the general consideration of this interesting style of decoration, not only with regard to what is known of its development, but also in connection with the art as occurring in other parts of Great Britain and Ireland. In the latter country, it is generally acknowledged, the best examples exist.

The *origin* of Celtic ornament is a question about which much diversity of opinion exists amongst competent authorities, and therefore no attempt is here made to trace it. Its application to the decoration of stones is doubtless derived from the MSS.,¹ as their dates are earlier than any of the stones whose ages have been ascertained by means of their inscriptions.

The absence of purely Celtic monuments in every part of England except Devon and Cornwall, is to be accounted for by the Saxon conquests, by which the Celts were driven northwards and westwards. Where Celtic influence can be traced in the art of the pre-Norman sculptured stones in England, it is due to the intercourse existing with Ireland at the time when the Scotie Monks settled at Lindisfarne.

I cannot better approach the subject of Celtic ornament than by quoting some of those authors who have spent so much time and labour in the investigations connected with this question.

Mr. J. Romilly Allen, F.S.A. (Scot.) in his paper on "The Analysis of Celtic interlaced ornament,"² says "a great deal of ingenuity has been wasted by various authors in speculating as

¹ Early Christian Art in Ireland. Miss Stokes, p. 198.

² Proceedings of the Society of Antiquaries of Scotland, 12th Feb., 1883, pp. 225 and 226.

to the probable origin of Celtic interlaced work, which would have been far better employed in studying the details of the ornament itself. The fact is, that the idea of interlaced bands applied to decorative purposes may have been suggested in a variety of different ways, as for example by any twisted, plaited, or woven fabric, or by braidwork patterns sewn upon garments. Mr. Anderson has pointed out that this species of ornament is to be found upon the works of art of most periods and of most nations,³ the only difference between Celtic knot-work and that produced elsewhere being, that in the former case it was made one of the leading features of the style of decoration, and was developed with an amount of ingenuity quite unparalleled, whereas in the latter case only the simpler kinds of interlaced patterns occur, and they generally occupy a very subordinate position in designs where more favoured forms predominate. The other authors who have dealt with this subject in the most rational manner are Professor Westwood⁴ and the Rev. J. G. Cumming."⁵

Prof. J. O. Westwood⁶ commencing an article on Celtic ornament, says "The genius of the inhabitants of the British Isles has, in all ages, been indicated by productions of a class or style singularly at variance with those of the rest of the world. Peculiar as are our characteristics at the present time, those of our forefathers from the remotest ages have been equally so. In the fine arts our immense Druidical temples are still the wonder of the beholder, and in succeeding ages gigantic stone crosses . . . most elaborately carved and ornamented with devices of a style unlike those of other nations, exhibited the old genius for lapidary erections under a modified form, inspired by a new faith."

We must not, however, leave the subject without some observations on the character and style of this Cornish work, one important feature is the adaptability of the material with which these primitive workmen had to deal. In districts where the stone is easily manipulated the work is found to be considerably

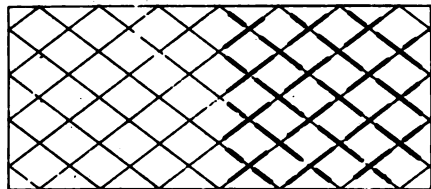
³ "Scotland in Early Christian Times," 2nd series, p. 111.

⁴ *Journal of the Archaeological Institute*, Vol. VII, p. 17, and Vol. X, p. 285.

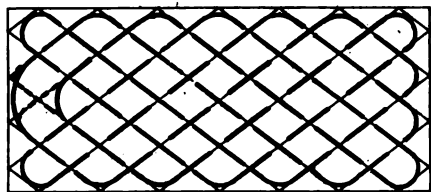
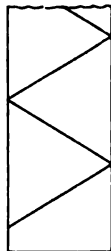
⁵ *Archæologia Cambrensis*, 1886, p. 156.

⁶ "The Grammar of Ornament," Owen Jones, p. 90 (London 1868).

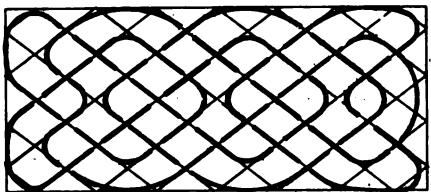
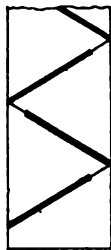
Diagrams shewing the method of setting out and developing interlaced work and key patterns.



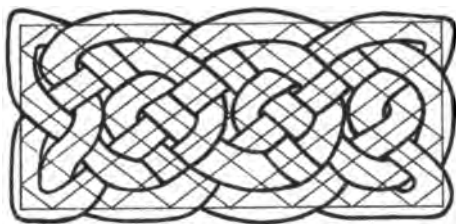
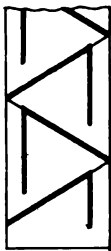
1



2



3



4



superior to that in other places, where the nature of the substance is less suitable. A striking instance of this occurs in the cross at Lanherne. It is the most beautiful specimen of an elaborately decorated cross in Cornwall, and executed with much greater care and skill than was usually bestowed on these monuments. This is probably accounted for by the fact of its being made of Pentewan stone, which is softer and more easily worked than granite, which, with one or two exceptions, is the material used for the others.

The wild and rugged characteristics of the Cornish land seem to find a kind of corresponding sympathy in the rude ornamentation of its crosses, and the primitive execution of its debased architectural details. As regards the former, I have already pointed out that most of the patterns are evidently debased copies of those beautiful forms of ornament, which, if they did not originate in Ireland, were at all events, so highly developed there, as to constitute a separate style of art. Two of the most typically Celtic forms of ornament are found in Cornwall, viz.: interlaced work and key patterns, but of the true Irish divergent spiral there are no examples, as the scrollwork which occurs on some of the stones appears to be more in common with the foliage of Northumbria.

The best examples in Cornwall of really good work are, (1) those with interlaced work, on the cross at Lanherne, on the shaft in St. Neot's churchyard, and on the two stones in St. Cleer, near Redgate; (2) those with knot-work, also on the Lanherne cross, and on the "Four-hole cross," Temple Moor; (3) those with key patterns, on the Sancreed churchyard cross, and on the beautiful recumbent stone in Lanivet churchyard; and (4) those with foliated scroll work, on the crosses in the churchyards of Lanhydrock and Lanivet.

METHOD OF SETTING OUT INTERLACED PATTERNS.

Plate 3.

In examining elaborate interlaced patterns, the question naturally suggests itself to us, "Upon what principle was the ornament arranged?" Many theories have been propounded and much speculation indulged in, as to the method employed in setting out the patterns, preparatory to executing the work. Of the various attempts which have been made to analyse, and,

as it were, to dissect the structure of these beautiful designs (many of which are of a very intricate character), Mr. Allen's explanation appears to me to be the most probable, proceeding as it does from the simple to the complex, and showing how the earlier forms have, probably from accident in many instances, suggested the further elaboration.

This will be best illustrated in the following diagrams, Plate 3 by which I shall show how No. 4 (an example taken from the shaft in St. Neot's churchyard) was developed from No. 1.

A panel to be decorated was first divided into squares set diagonally, or into diamonds,¹ this depending of course upon the nature of the ornament to be introduced. Of the former class some good examples are given by him, in a paper showing the construction of the interlaced work on the cylindrical pillar at Llantwit Major (Glamorganshire). This paper appeared in the October (1889) number of the "*Archæologia Cambrensis*," pp. 317-26. We must, however, take one of the latter as an instance, in which the diamond scheme is adopted. Having divided the panel into diamonds, as shewn in the upper part of No. 1, the next stage is to emphasise the crossings alternately by stronger lines, as shewn in the lower portion of the same diagram; then by joining up the ends of the cords at regular intervals, as at the bottom of No. 2, we get a regular eight-cord plait. Now it is in the joining up of these cords, or "breaking" the plait as it is termed, at various points, according to the design required, that the whole secret of interlaced work lies. At the top of No. 2 is a very simple illustration of this, which occurs on the "Other Half Stone," at St. Cleer. Had the ends been joined up as shewn by the dotted lines, the whole panel would then have been composed of a regular eight-cord plait; but owing to the change caused by this departure from the regular plait, by "breaking" it, it now becomes a piece of broken plaitwork.

Passing on to No. 3 a still further development is shewn, caused by increasing the number of breaks in the plait. By strictly adhering to the diagonal lines, an uncomfortable angular

¹ The Japanese set out their key patterns and geometrical designs on the same principle.

effect is produced, an objection which doubtless made itself apparent to the original designers. In No. 4, however, the difficulty is entirely got over by curving the lines. The design of No. 4 is precisely the same as No. 3, except that the complete interlaced band is drawn instead of only the centre line. And it will be seen that the *underlying* principle of the diagonal lines is *still* there, with which we commenced, and upon which the design was built up.

The conclusion based on this theory at which we arrive is, that if a piece of tracing paper be laid over an interlaced design, and diagonal lines drawn over the cords, a network, as shewn in the top of No. 1 will be the result, and by joining up the ends of the cords where required, the whole design will be completed.

In working out complicated, or indeed, any key patterns, the simple method of commencing with the main lines and developing gradually is illustrated in the paper on Celtic analysis, already referred to, a similar example of which I give on Plate 3 taken from the S. side of the cross in Sancreed churchyard. In concluding my remarks on this interesting subject, I can only say (from sad experience) that if anyone attempt to sketch these patterns without a method, he will find himself involved in a state of chaos he has never before enjoyed.

I conclude Part I of my paper by a full analysis with illustrations of the different patterns found on the various Celtic monuments in Cornwall. Below the Cornish examples are given the localities where similar specimens exist, all of which have been taken from the following works:—

Manual of Sepulchral Slabs.—Rev. E. L. Cutts, D.D., London, 1849.

The Sculptured Stones of Scotland.—Stuart, printed for the Spalding Club, 2 Vols. Aberdeen, 1856-67.

Christian Inscriptions in the Irish Language.—George Petrie, LL.D. (Annual Vol. of Royal Hist. and Arch. Assoc. of Ireland), Dublin, 1872.

Lapidarium Wallia.—Prof. J. O. Westwood, M.A., F.L.S. Oxford, 1876-9.

The Analysis of Celtic Ornament.—J. Romilly Allen, F.S.A., Scot., (Proc. Soc. Ant., Scot., Vols. 17. 19). Feb. 1883.

Ancient Sepulchral Monuments.—Brindley and Weatherly, London, 1887.

ANALYSIS OF CELTIC ORNAMENT IN CORNWALL.

Names of Places out of Cornwall, in Great Britain and Ireland where examples of the same pattern occur, are in smaller type. The districts are taken in the following order throughout: 1, England; 2, Wales; 3, Scotland; 4, Isle of Man; and 5, Ireland; and the counties, except where necessary, are only inserted after the first mention of a place.

INTERLACED WORK.

(1.) REGULAR PLAITS.¹(a.) *With Four Cords.*

N.B.—All examples to this Scale.

[The word "TOP" on the blocks refers to the position of the pattern on the stone].

Names of Places in Cornwall where each Pattern occurs.

St. Blazey.—Biscovey (north-east side).

St. Cleer.*—On Doniert's Stone (north-east side.)

St. Minver.—St. Michael, in churchyard (east side of shaft).

Aycliffe and Chester-le-Street, Durham; Gosforth, Cumberland; St. John's, Chester; Dinsdale-on-Tees (2), Yorkshire; Ilam, Staffordshire; Peterborough, Northampton.—England.

Carew and Nevern, Pembrokeshire; Llandough, Llantwit, and Margam, Glamorganshire; Maen Achwynfan, Flintshire; Penmon, Anglesey.—Wales.

Benzie and Farnell, Forfarshire; Jordan Hill and Govan, near Glasgow; Inchinnan, Renfrewshire; Mansfield, Ayrshire; Stanlie, Paisley, Abercromby, Fifeshire; Bressay, Shetland.—Scotland.

Tuam, co., Galway; Durrow, King's Co.—Ireland.

¹ Where a termination of a pattern in the interlaced work exists, it is given to show the methods by which the cords can be joined up so as to leave no loose ends.

* Places marked thus * denote where the illustrated example exists.

(b.) *With Six Cords.*



St. Blazey.—Biscovey (south-east front).

St. Cleer*—On Doniert's Stone (south-west side).

Quethiock.—In churchyard (south front).

Aycliffe and Gainford, Durham ; Brompton, Yorkshire ; Fulbourn, Cambridge ; Dinsdale-on-Tees (2), Yorkshire ; Helpston, Peterborough. Coychurch and Margam, Glamorganshire ; Llanbadarn-Fawr, Radnorshire ; Meifod, Montgomery ; Penally, Pembrokeshire ; Penmon, Anglesey.

Aldbar, Forfarshire ; St. Andrew's, Fifeshire.

(c.) *With Eight Cords.*



St. Neot*—In churchyard (west side, all three panels).

Copplestone Cross, Devon ; Aycliffe, Gainford, and Lindisfarne, Durham.

Llandeilo Fawr, Brecknock ; Nevern, Penmon.

Liberton, near Edinburgh ; Rothesay, Bute ; Docton, Fifeshire ; Aldbar, Jordan Hill.

Clonmacnois, King's Co.

(2.) *ANGULAR PLAITS.*

(a.) *With Four Cords.*



Phillack.*—In churchyard. On all four sides.

Castor and Longthorpe, Northamptonshire.

(b.) Irregular, Angular Plaitwork.

Quethiock.—In churchyard (south front).

*(3.) BROKEN¹ PLAITWORK.**(a.) With breaks made symmetrically.*

St. Blazey.—Biscovey (north-west front).

St. Cleer.—On "The Other Half-Stone."

St. Neot.—In churchyard; (east side, top panel; and south side, top and middle panels).

(b.) The same as foregoing, but with rings introduced.

St. Neot.—In churchyard (east side, bottom panel).

N.B. Of course different varieties of this class occur in other districts; but the combinations being varied in almost every conceivable manner, it is extremely doubtful if a corresponding specimen of those examples in Cornwall can be found in other places, although the treatment may, in some cases, be considered somewhat similar.

*(c.) With breaks made symmetrically, and spaces left.**With Four Cords.*

Lanhydrock.—In churchyard (west front).

Lanivet.²—In churchyard, on west cross (west front).

St. Neot.*—Four-hole cross on Temple Moor (north-east side).

N.B. Examples of this pattern in double rows are found in other districts, as well as a horizontal treatment of the knots; but the three specimens in Cornwall are all single, the only difference between them being that in those at Lanhydrock and Lanivet there is no space left between

¹ The term "broken plaitwork" implies that the pattern consists of joining up any two cords instead of carrying them forward, thus distinguishing them from the "ordinary regular plaits." One result of this method is the leaving of spaces in the work; but the term really applies to the "breaking" or "stopping off" of the cords at regular or irregular intervals.

² There are two crosses in Lanivet churchyard, one on the west, and the other on the north side of the church, which, for distinction will be called the west cross, or, the north cross.

the knots, so that they are in reality a continuous band of figure-of-eight knots, unlike the cases where they appear separately.

Kirkby Moorside, Yorkshire ; Nasington, Northampton ; Gainford, Lincoln.

Llanynnis, Brecon ; Llanbadarn-Fawr, Llandough, Margam.
Cosins, Monifieth, St. Vigean's, and Kirriemuir, Forfarshire ;
Crieff, Perthshire ; Rothsay, Govan, Meigle.
Darrow, King's Co. ; Kilgispeen, Co. Kilkenny.

(d.) *With Breaks made unsymmetrically, or irregular, broken Plaitwork.*

Padstow.—In churchyard (west side) (?).

St. Erth.—In churchyard (south front).

St. Just in Penwith.—In north wall of church (unfinished).

St. Neot.—In churchyard (north side, middle panel).

(e.) *The same as foregoing, but with a Ring.*

St. Neot.—In churchyard (south side, bottom panel).

N.B. There is a considerable difference in the workmanship of the patterns given under this head (d), which is worth noting ; *e.g.*, the work at St. Neot is extremely good, whereas that occurring on the other stones is extremely poor and debased ; for the bands do not lap over and under each other regularly, and in some instances stop suddenly without being properly joined up.

(f.) *Irregular, broken plaitwork with spaces left.*

Cardynham.—In churchyard (south front).

Minster.—Water-Pit Down (east front).

Sancreed.—Vicarage-gate cross (front).

(4.) DEBASED FORMS OF PLAITWORK.



Lanivet.—In churchyard, west cross (on north side).

Padstow.*—Prideaux Place (all four sides) (?).

(5.) KNOTWORK.

(a.) *Figure-of-Eight Knots.*

Cardynham.—In churchyard (east side of head).

Gulval (?).—In churchyard (west front), one end of figure broken.

Mawgan in Pyder.*—Lanherne (south-west front).

Gainford.

(b.) *Spiral Knotwork*

Mawgan in Pyder.*—Lanherne (south-east side).

St. Blazey.—Biscovey; on north-west front of the inscribed stone a single panel of spiral knots in double row, terminating in a pair of Stafford knots.

Hickling, Notts.

Penally.

Abbotsford, Roxborough; Aberlemno, Forfarshire; Arthurlee, Renfrewshire.

(c.) *Stafford Knotwork.*

Mawgan in Pyder.*—Lanherne (north-west side).

Minster.—Water-Pit Down (west front).

St. Blazey.—Biscovey; on north-west front of the inscribed stone a single panel of spiral knots in double row, terminating in a pair of Stafford knots.

Sancreed.—Vicarage-gate cross (right side).

Aycliffe, Durham; Bexhill, Sussex.

The above last two named have the dragon's head also.

N.B. Examples of this pattern, without the serpentine band, and in double rows, are found in other districts, as at Jordan Hill, Kirriemuir, Jedborough, Scoonie, Inch-

breyock, Scotland; Aycliffe, Billingham, Jarrow, Durham; and Llandough, Wales; but those occurring in Cornwall are all single, and have the serpentine band, except St. Blazey, as already explained.

(d.) *S-shaped Knotwork.*



St. Neot.*—In churchyard (east side, middle panel).

N.B. The diagonal treatment of the middle band in this beautiful example is, as far as I have been able to ascertain, unique.

(6.) RING-PATTERNS.

(a.) *Twists and Rings.*



No. 1.



No. 2.



No. 3

Cardynham (No. 3).*—In churchyard (east side).

Gulval.—In churchyard (east front) like No. 2, but worked into an irregular pattern above.

Mawgan in Pyder* (No. 1).—Lanherne (north-east front).

Minster.—Water-Pit Down (west front, bottom panel).

Padstow* (No. 2).—In churchyard (east side).

Quethiock.—In churchyard (east side).

Hexham, Norham, and Warden, Northumberland; Aycliffe,
Gainford, Hickling.

Llandeaelog, Brecknockshire; Llantwit, Penally, Penmon.

Liberton, Edinburgh; Monreith House, Wigtonshire; Drainie,
Elgin; Bressay, Inchinnan, Rothesay.

Kirk Michael, Isle of Man.

(b.) *Plaits and Rings.*¹ *With Four Cords.*



St. Neot.*—In churchyard (north side, top panel).

Copplestone Cross.

Wigtown and Monreith House, Wigtonshire.

(c.) *Chains of Rings.*



Cardynham.*—In churchyard (west side).

Gosford and Dearham, Cumberland; Burnsall, Yorks.

Penmon.

Kirk Andreas, Kirk Christ's, Kirk Michael (2); Ballaugh Rushen
and St. John's, Tunwald.

(d.) *Irregular Ring-Patterns. Twists and Rings.*

Gulval.—In churchyard (west side).

¹ Formed by a four-cord plait with the crossings of the bands emphasized by a ring.

(7.) KNOTS.

(a.) *Two Oval Rings interlaced Crosswise.*



Lanivet.—In churchyard, on Celtic coped stone.

Mawgan in Pyder.—Lanherne (south-east and north-west sides, on head).

Minster.—Water-Pit Down (east front).

Quethiock.—In churchyard (on lower limb of head).

St. Breage.—In churchyard (west side, on ring).¹

St. Cleer.*—On Doniert's Stone (two out of four complete on north-west front).

St. Columb Major.—In churchyard (on lower arm of head).

St. Teath.—In cemetery (north side, on arm).

Aycliffe and Billingham, Durham ; Dinsdale-on-Tees, Dearham.

Golden Grove, Carmarthenshire ; Corwen, Merionethshire ; Carew,

Llandough, Llantwit, Margam, Meifod, Nevern.

Meigle, Perthshire ; Govan, Inchinnan.

(b.) *Two Oval Rings crossed diagonally combined with two Concentric Circles, all interlaced.*



St. Just in Penwith.*—In church (north wall).

St. Neot.—In churchyard (north side, bottom panel).

Jarrow, Northumberland.

Govan.

¹ The only instance in Cornwall where the connecting ring of the cross is ornamented.

(c.) *Miscellaneous Knots.*

Cardynham.—In churchyard (south front).

N.B. This is a very curious knot, and quite unlike any others. Being somewhat abraded, it is uncertain what it was originally intended for.

(d.) *Triquetra Knots.*

(Occur on only the Heads of the Cornish Crosses).



(I.) Pointed.



(II.) Rounded.

I.

Lanivet.—In Churchyard on Celtic coped stone (double beaded).

Padstow (2).—Prideaux Place; in Dr. Marley's garden.

Quethiock.—In churchyard.

St. Breward.—At National Schools.

St. Neot.*—"Four-hole cross."

Tintagel.—Trevena.

I AND II.

Lanivet.—In churchyard (west cross, east and west fronts).

St. Columb Major.*—In churchyard.

St. Teath—In cemetery.

I OR II.

St. John's Chester; Warkworth and Warden, Northumberland.

Llanfrynach, Pembrokeshire; Llantwit, Maen Achwynfan, Margam, Llaugharne, Carmarthenshire; Meifod and Penally.

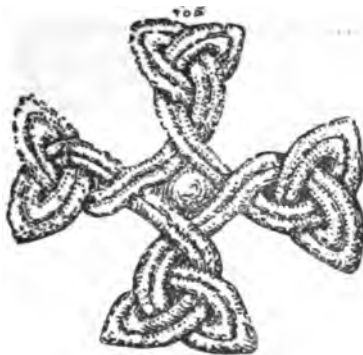
Chapel of the Garloch; Dupplin Castle, Perthshire; Oronsay, Argyll; Meigle, Govan, St. Andrew's.

Douglas, Calf of Man; Kirk Michael.

Killamery, Co. Kilkenny; Clonmacnois, on six stones.

N.B. The above examples (I or II) are not confined to the heads of the crosses, but occur as well on the shafts.

(c.) *Method of combining four Triquetra Knots.*



III.

Cardynham.*—In churchyard (north front).¹

Coychurch, Glamorganshire.

KEY PATTERNS.

(a.) *Square Key Patterns.*



Camborne—In church, altar-slab.

Pendarves.—In grounds, ditto.

Cardynham.*—In churchyard (west side).

Kirkby Wharfe, St. John's.

Llangaffo, Anglesey; Carew and Llanwnda, Pembrokeshire;
Golden Grove.

Kilkerran, Argyleshire.

Clonmacnois (on Sechnasach's grave-slab, A.D. 931), King's Co.

¹ Similar design on south front, but formed of a single bead only.

(b.) *Diagonal Key-Patterns.*

I.

Gulval.*—In churchyard (north and south sides).

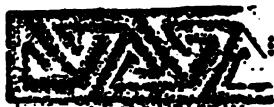
Cardynham.—In churchyard (west side of head).

Minster.—Water-Pit Down (north side).

Kirkby Wharfe.

Invergowrie, Perthshire ; Kilkerran, Benvie, Liberton, St. Andrew's.

II.



St. Erth.—In churchyard (west side).

Sancreed (2).—In churchyard* (south side) ; Vicarage-gate cross (right side).

Llantwit, (but double.)

Rosemarkie, Ross-shire ; Drainie, St. Andrew's.

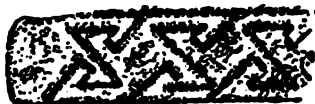
III.



Lanivet.*—In churchyard, on Celtic coped stone.

Penally.

IV.



Lanivet.*—In churchyard, on Celtic coped stone.

Penally.

(c.) *Debased Key Patterns.*

Lanivet.—In churchyard (north cross, east and west sides).

SCROLLWORK.

There are no examples in Cornwall of the true Irish divergent spirals, but only specimens of foliated or apparently debased scrollwork of different varieties, one of which consists of flat kind of scrolls having the spandril filled with a short, pointed stem, like the illustration below.

(b.) *Foliated Scrolls.*

I.



Cardynham.—In churchyard (north front).

Minster.*—Water-Pit Down (north side).

Another variety exists on the Water-Pit Down Cross. There is a serpentine band similar to Lanherne; but instead of the knots in the spandrils, an elongated leaf-pattern is introduced, which gives a late impression of the work. Two examples very similar to this are found at Kilchouland, Cantire, and Kilkerran, Argyll. The latter is inscribed in thirteenth century letters.

Quethiock.—In churchyard (west side).

St. Teath.—In cemetery (south side).

II.



Lanhydrock.—In churchyard (east front).

Lanivet.—In churchyard (west cross, west front and south side).

St. Neot.*—"Four-hole cross" (south-west side).

The scrolls on these crosses look very like thirteenth century work.

(c.) *Double Scrolls.*

St. Teath.—In cemetery (north side).

Cable-Moulding.

The following stones are decorated with a cable-moulding on the angles,—the coped stone in Lanivet churchyard, the shaft in Gulval churchyard, and the cross at Trevena, Tintagel. It also occurs on the last named, on the end of the lower arms on each side, that on the others having been knocked off.

Mutilated Ornament.

Some of the Celtic ornament on the crosses is so much worn that it is almost impossible to trace the patterns with any amount of certainty, there only being sufficient indications or markings left to enable one to say to which of the three divisions they belong. I have, therefore, been unable to include them in the analysis, but give a list of them separately, as follows :

(1.) *Interlaced Work.*

Lanhydrock.—In churchyard (north side).

Padstow.—In churchyard (each front and west side).

Perranzabuloe.—On Perran sands.

Quethiock.—In churchyard (north front).

S. Erth.—In churchyard (east and north sides).

(2.) *Scrollwork.*

Lanhydrock.—In churchyard (south side).

Quethiock.—In churchyard (north front ?)

PART II.

INCISED ORNAMENT.

This quaint style of decoration is somewhat common in Cornwall. Its use is chiefly confined to the Western portion of the County, and more particularly to those districts in the vicinity of the Land's End and the Lizard.

As the term implies, it was a simple method of executing the designs, by means of incised lines, and, it must be clearly understood, that this definition relates only to the *manner* in which the work was done, and not to the various geometrical or other forms of which the designs are composed.

In other localities where this work occurs, it is considered, as a rule, to indicate an early date: yet, it is worthy of notice, that in Cornwall, incised decoration was freely used on some of the crosses which have Celtic ornament upon them, showing, that here at least, the two styles were contemporary.

On the Celtic Monuments of the best period, the patterns are always executed with the greatest possible care and finish, the designs being in relief, and not incised, except in a few rare instances, as at Nigg in Ross-shire, and Irton, Cumberland, and Ilkley in Yorkshire, where it seems to have been done with a view to produce a contrast with the rest of the work. In this county, however, no incised Celtic patterns have as yet been discovered—unless indeed the work on the Phillack churchyard cross may be taken as such. For this reason, it has been found convenient to classify all the incised ornament together, because, none of the patterns can be placed under the head of Celtic ornament. The books enumerated, as having been referred to in connection with interlaced work, have also been consulted in relation to incised ornament, but no examples can be found to correspond with those forms which exist in Cornwall.

In consequence of the great contrast exhibited in the formation of the designs, and the total absence of patterns, bearing a likeness to those found elsewhere, I have been

obliged to omit in my analysis of Part II, a column of corresponding instances, such as I was able to insert in connection with the analysis of Celtic ornament. The same reason accounts for its absence in Part III.

Incised work was very commonly employed in the decoration of Christian monuments in Great Britain, and chiefly, perhaps, in Scotland. In that country, the oft recurring figures, known as the spectacle ornament (either alone, or in conjunction with, a sceptre), and other figures of a different character, are all beautifully finished examples of the art. In this class of work again, as in the other forms of ornament, the Cornish examples are roughly executed, the hardness of the stone, no doubt, being responsible for the rudeness of the work.

We find specimens of incised decoration on nearly all the different types of our crosses, but more particularly on the wheel crosses, and I have noticed that where it does occur, the entasis on the shafts is more pronounced than on the other stones which are differently ornamented.

The *kinds* of figures of which we possess examples, are not exactly *patterns*, but representations of objects, and, (excluding a variety of Greek and Latin crosses) consist chiefly of the following:—

(1). A parallelogram, or a square, with diagonal lines from corner to corner, which latter, may, or may not, be intended to represent a S. Andrew's cross.

(2). A figure something like an hour-glass, at least it bears more resemblance to one than to anything else.

(3). A shield; while others are simply composed of straight lines, zigzags, rude scroll work, and the like. These with other miscellaneous forms, complete a list of those in most general use. Of all the different designs—if they may be so called—which have been introduced in this style, the most curious and common consists of a number of little conical holes, placed either in horizontal rows, diagonal rows, or, indiscriminately on the face of the stone,—but always close together. They are I believe, peculiar to Cornwall, and therefore deserve special mention. They measure rather less than an inch in diameter, from half to three-quarters of an inch in depth, and from an

inch and a half to three inches from centre to centre. Two crosses are entirely decorated with these holes. One is on Connor Down (Gwinear), and the other in Penzance Market Place. The only difference being that in the former case they may best be described as being placed "anyhow," while in the latter, they are arranged in regular rows, in panels.

Now with regard to these little holes or dots, some authorities consider them to be the setting out points of interlaced patterns previous to the execution of the work,—but I have already shewn in my article on this subject what method was most probably employed at this stage of the operation. What might be taken as an example in favour of the above theory, is found on the unfinished cross-shaft in the church of S. Just in Penwith, at one end of it is a square panel containing a knot formed by two oval rings, combined with two concentric circles all interlaced. At the other end is some partly completed debased plaitwork, and the remaining portion of the stone, in the middle, is marked out with holes at regular intervals, but they are much larger and further apart than is usual. Mr. E. P. Loftus Brock, F.S.A., informed me that he had seen other stones in a similar condition, as if it had been intended ultimately to finish the ornament. On the other hand I am of opinion, that in Cornwall at least, where they occur in such close proximity to each other, and are even used as a back ground, no further development was intended, more especially as the effect produced by them alone is often very rich.

I have at present found only one incised example of our Lord's figure. It is on a small wheel cross in Trevu grounds, (Camborne), and was found about 1882, in the hedge by the side of the old Roman road from Penzance to London, which runs at the back of Trevu. The figure is extremely rude and the feet have either been omitted or have disappeared. On the back of the stone is a Greek cross in relief with expanded arms. Mr. Roberts, the gardener, who discovered it, informed me that when it was taken out of the hedge, a small bronze image was found about three inches high. It consisted of a woman with a child on her lap, the head of the former was unfortunately gone. The figures were probably intended to represent the Virgin and Child.

The cross in Sancreed churchyard possesses the best specimen of this art. I refer to the well-known design of the Vessel and Lily, supposed by some to represent the Holy Grail and Lily of the Virgin.

Some of the remaining forms will be more fully dealt with in the description of the two crosses which have been selected as examples of this style of decoration.

The following is a list of 66 crosses, &c., which have incised work upon them.

GEOGRAPHICAL DISTRIBUTION OF CROSSES WITH INCISED
ORNAMENT.

- | | |
|--|---|
| (a) <i>On Wheel Crosses.</i> | Mullyon—Pradannack. |
| Altarnun—Tresmeake Bridge. | S. Buryan—Vallensajer. |
| Blisland—Lavethan. | S. Day—Tregulow. |
| Boconnoc—In grounds. | S. Hilary—In churchyard. |
| Bodmin—Callywith. | S. Just in Penwith—In Rectory garden (2). |
| Budock—In churchyard (2). | S. Kew—Polrode Mill. |
| Camborne (2)—Pendarves, Trevu. | S. Levan—In churchyard. |
| Cardynham—Deviock. | S. Wendron (3)—Manhay, Merther Uny cross, Trenethick. |
| Carmenellis—In churchyard. | Tintagel—Trevena. |
| Constantine (4)—Bosvathick, Merthen, Nanjarrow, Trewardreva. | Tywardreath—Menabilly. |
| Crowan—Clowance. | (b) <i>On Wheel Crosses with projections at the neck.</i> |
| Cury—In churchyard. | Camborne—Outside the Institute. |
| Helston (2)—Cross Street, Mr. Baddeley's garden. | Gwinear—On Connor Down. |
| Landewednack—Lizard Town. | Mylor—In churchyard. |
| Lanivet—In churchyard (N. cross). | Penzance—In Market Place. |
| Lanteglos by Camelford (2)—Trevia, Trewalder. | Phillack—In churchyard (N. cross). |
| Mabe—Helland. | Roche—In churchyard. |
| Madron (3)—In churchyard (base of cross), Boswhar-ton, Trembath. | S. Day—Scorrier, in grounds. |
| Michaelstow—Trevenning (2). | S. Wendron—Merther Uny old churchyard. |

Lanivet Churchyard, N. Cross.



- | | |
|--|---|
| <p>(c). <i>On Latin Crosses.</i></p> <p>Blialand—Lavethan.</p> <p>Godolphin—In churchyard.</p> <p>Madron—Boscathnoe.</p> <p>Northill—Trebartha.</p> <p>S. Austell—Treverbryn.</p> <p>S. Neot—In Vicarage grounds
(2).</p> <p>Temple—In churchyard (4).</p> | <p>(d). <i>On other crosses of different forms to the foregoing.</i></p> <p>S. Breage—In churchyard.</p> <p>S. Cleer—On "The Other Half Stone."</p> <p>S. Dennis—In churchyard.</p> <p>S. Neot—"Four hole cross."</p> <p>Sancreed—In churchyard.</p> <p>(e). <i>On early slabs and rectangular stones.</i></p> <p>S. Wendron—In church.</p> <p>Towednack—In church porch.</p> |
|--|---|

Two of the crosses contained in the foregoing list will now be described.

THE NORTH CROSS IN LANIVET CHURCHYARD.

Plate 4.

Lanivet, in the Deanery of Bodmin, is situated 3 miles S.W. from the town of that name, and about $3\frac{1}{4}$ from the G.W. Railway Station. The granite monolith stands in the churchyard on the north side of the church, and is the best example in this style. There is an old saying, that it is in the middle of the county, north and south, east and west. It is one of the rare examples of a highly decorated wheel cross, but the amount of incised work found on the other crosses, bears no comparison to that on the one in question, and it was not until the Rev. W. Iago and I had spent over two hours in removing the lichen, &c., and cleaning the stone, that we discovered how richly ornamented it was. There is a look, too, of great age about this stone, which is not so noticeable in others carved differently.

The head—which is much broken away on the S. side, is slightly elliptical, and shews a cross of the usual form on either front, with a central boss and encircling bead, but there is no other enrichment.

There is a very marked entasis on the shaft which is beaded at the angles. With the exception of two panels of debased key pattern ornament, the whole of the shaft is elaborately decorated with incised work, and the constant recurrence of the

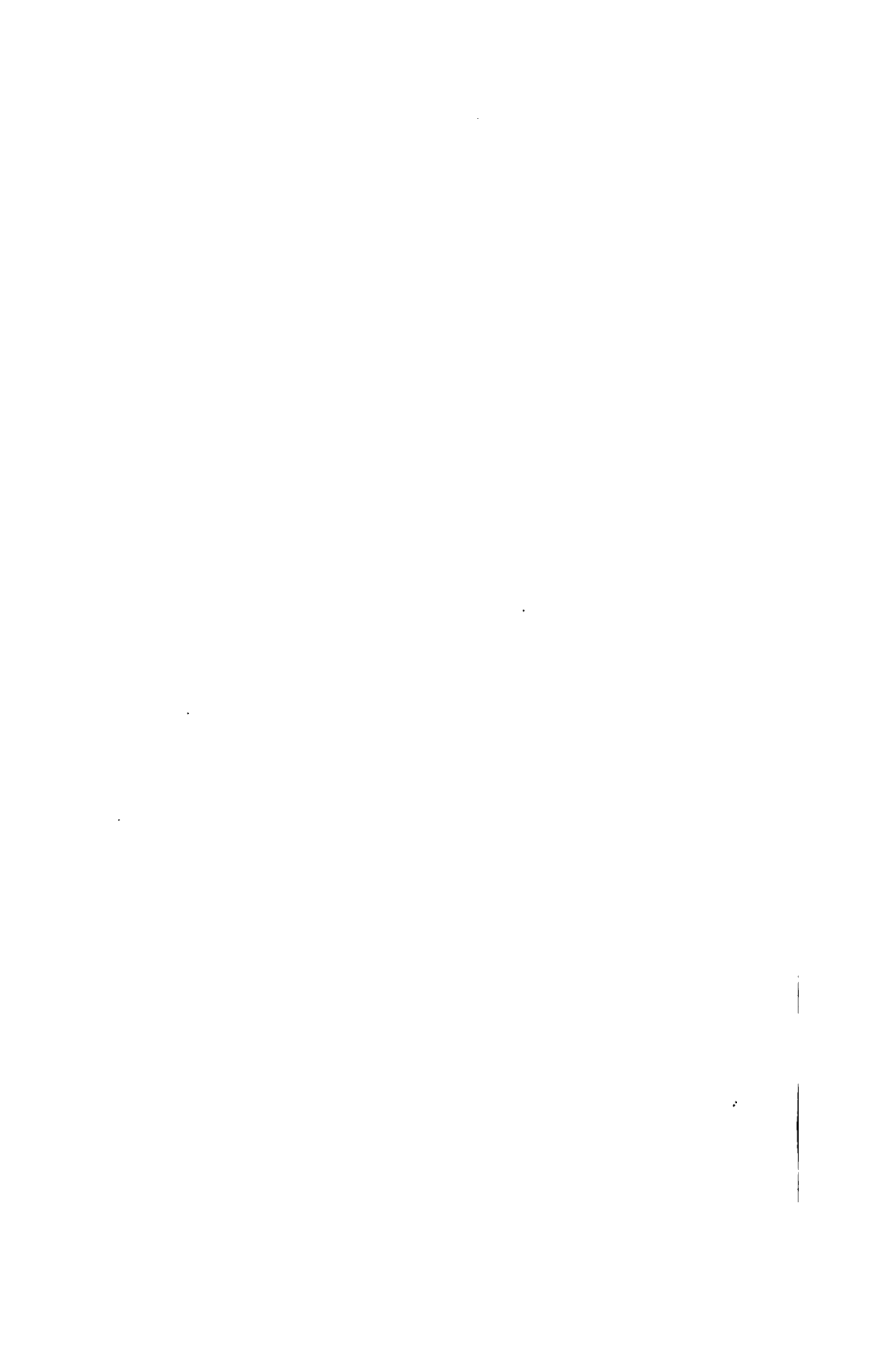
little sunk holes already referred to, is here very noticeable,—in fact their use in the treatment of this shaft is very general. We were able, with the assistance of an iron bar, to trace the base of the cross, which is some 12 inches below the ground, and I have therefore shewn it in the accompanying drawing.

The dimensions are as follows :—Total height of the cross from the base, 10-ft. 4in., diameter of head, 1-ft. 10-in., width of the shaft at the neck, 14½-in., at the bottom, 1-ft. 6½-in., thickness at the bottom, 13-in., tapering to 8-in. at the top. All four sides are enriched as follows :—

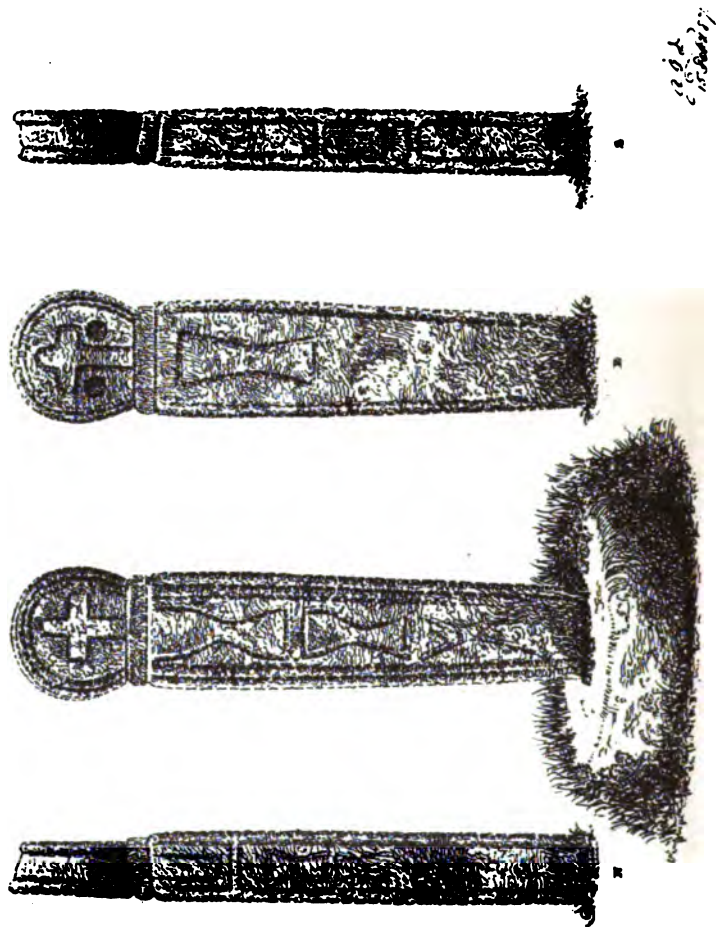
S. Side. This is divided into six panels, but without a separating bead (1), at the top, a long panel of holes; (2), a square panel with diagonal lines from corner to corner; (3), a plain narrow panel; (4), a long panel containing a well proportioned Latin cross; (5), a square plain panel; (6), a long panel filled with little holes.

E. Front. This is divided into five panels, (1), a panel with diagonal lines resembling a S. Andrew's cross, but irregularly cut, as are also the spandril lines, and too much abraded to define accurately; (2), the largest panel on the cross. A most remarkable object, is found here, consisting of the figure of a man, rudely drawn in outline, 2-ft. 11-in. high. The features still remain, and on the body are some peculiar markings like letters. An "S" and a "C" are quite distinct, but whether they are really intended for letters, or are the result of the wearing away of some ornament must be left for others to determine. The lines of the arms are carried round the head in a curious way, the legs are well defined, the feet turn the same way, *i.e.* to the right. Between the legs are other markings which also look something like letters. But the most extraordinary detail of the whole figure, exists in what certainly appears to be a *tail*. About half way down which is a heart-shaped figure, terminating in a double cross. The space between the right leg and the bead on the angle of the cross, is filled with holes, and there are three or four between the feet. (3), a

¹ Panels of little holes should always be carefully examined, as the spaces between are often broken away, causing markings to appear, resembling *e.g.* letters, which in reality do not exist.



S. Dennis Ch. Yd.



panel of debased key pattern ornament; (4), a narrow panel containing three rows of little holes; (5), a double panel divided vertically by an incised line. The S. panel is filled with holes; the N. is again divided, the S. side contains holes, and the N. a Latin cross.

N. Side. Also divided into six panels: (1), a long panel with a Greek cross near the top, and the remainder decorated with little holes in regular rows; (2), a square panel with a S. Andrew's cross (by the spandrils being marked, another is formed outside the incised one); (3), a panel of holes; (4), an oblong panel containing two concentric circles; (5 & 6), divided by a bead, are too much worn to define. A large hole has been made at the bottom of the latter.

W. Front. Also divided into six panels: (1), a narrow panel with two rows of holes, the top line formed by the ring of the cross; (2), separated from the above by a broad flat bead, is a panel containing markings similar to those found on the top panel of the E. front; (3), a narrow panel with diagonal lines from corner to corner; (4), a square panel containing debased key pattern ornament similar to that on the E. front. (5), an oblong panel with three regular rows of holes; (6), a long panel surrounded by a bead, in the middle is a cross reaching nearly to the top, the three upper limbs have tau ends, the lower one is carried to the bottom. The top of the cross leans slightly over to the S. On the left side of the cross and two inches from it, is the shaft of what seems to be a crosier, with the crook encircling the upper limbs of the cross.

In addition to the number of panels already given, there appears to have been yet another below, as there are indistinct markings left, but all too much mutilated to say for what they were originally intended. The upper portion only is visible, the rest being buried.

THE S. DENNIS CHURCHYARD CROSS.

Plate 5.

S. Dennis, in the Deanery of S. Austell, is 2½ miles from Victoria Station, on the Cornwall Minerals Railway. It is mentioned in Doomsday Book as "Lan-Dines, the Church on the Hill." It is built in the middle of an old entrenchment, and

situated in a similar way to the church on Brent Tor, being reached by a road winding round the hill.

The granite monolith stands near the S. porch, and is entirely different in form from any of the other crosses. The head is of horse-shoe shape, with a double bead running round the curved portion, and stopping on the top of a kind of flat collar surrounding the neck, which is lower on the E. front than on the W. front, the sides are sloped to connect them. The shaft, with entasis, has beaded angles also stopped on the collar, and possesses the somewhat curious feature of being considerably wider at the top than at the bottom.¹ The original circular base remains, and the monument in its complete state is considered to be *in situ*.

The dimensions are:—Total height of the cross, 6-ft. 7-in., width of head, 18-in., the shaft is $15\frac{1}{2}$ -in. wide at the top, and 12-in. at the bottom, thickness on S. side, $8\frac{1}{2}$ -in. at the bottom, diminishing to 7-in. at the top, and on the N. side it is about an inch thicker altogether. All four sides are ornamented with incised work as follows:—

N. Side. The head is beaded, and the shaft has two panels, the upper one is very small and is simply double beaded, the lower one contains three separate figures, which vary slightly in shape, and resemble, if anything, an hour glass. The only things of this shape that I have seen, are some glass tumblers about 3 inches high which were taken out of a grave, in the old Roman burying ground, near Rio Tinto, Spain.

W. Front. On the head a plain Latin cross in outline, on the shaft another bead inside that at the angles, containing three of the figures already described, all varying in form.

S. Side. The head is beaded at the angles, and the shaft is divided into four irregular panels by beads.

E. Front. On the head, a Latin cross similar to that on the W. front, but with rounded ends to the arms and head. A round hole about $2\frac{1}{4}$ -in. in diameter is sunk on each side of it.

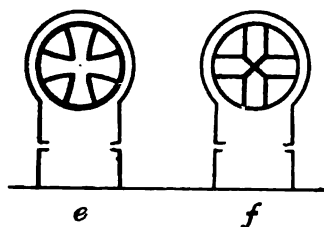
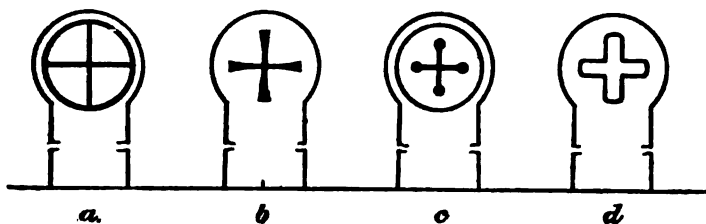
¹ Others shaped thus, are found at Helston, Boconnoc, Pendarves and Trevean.

On the shaft at the top, one of the hour glasses as before. The only other place in Cornwall where this device occurs, is on the cross at Clowance, Crowan.

I conclude Part II with the following analysis of incised work, which is divided into two heads, "Crosses" and "Ornament." It was found convenient in the former, to separate the wheel crosses from the Latin crosses. This is not required in the latter, a glance at the list of the stones will give the kind of cross upon which the work exists.

ANALYSIS OF INCISED CROSSES AND ORNAMENT.

CROSSES.



(1). GREEK CROSSES.

(a). *A cross within a circle.*

On Wheel Crosses.

Camborne—Pendarves.
Constantine—Trewardreva.
S. Day—Scorrier, in grounds.
(Cut in the middle of wide
beads).

(a II). *A plain cross without the
circle.*

Blisland—Lavethan.

S. Just in Penwith—In Rectory
garden.

(Cut in the centre of a cross
in relief).

Another example occurs
on the *Shaft* of the N. cross in
Lanivet churchyard. (N. side
top panel).

(b). *With expanded arms.*

Michaelstow—Trevenning.

(c). *With a round sinking at the
ends of the limbs.*

Budock—In churchyard (2).
Mabe—Helland.

(d). *In outline (of different forms).*

Michaelstow—Trevenning.

S. Dennis—In churchyard (on front and back).

In the middle of the inscribed altar slab in Camborne church, is one of these crosses with expanded arms. The example at Trevenning is similar, and enclosed by a circle.

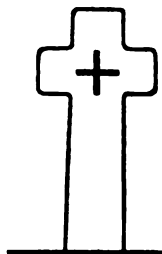
(e). *In outline.*

Helston—Cross Street.

(f). *Similar to (d), with the four internal angles connected by diagonal lines.*

Crowan—Clowance.

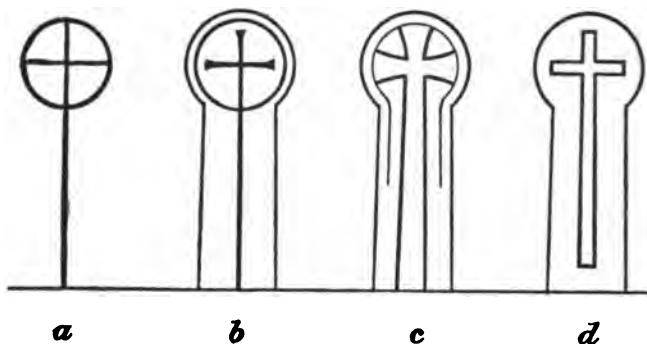
On Latin Crosses.



Godolphin—In churchyard.

S. Austell—Treverbyn.

Temple—In churchyard.



(2). LATIN CROSSES.

On Wheel Crosses.

(a). *Cross and Circle.*

Pradannack—Mullyon.

(The bottom of the circle is slightly curved on to the shaft).

Another example occurs on the cross slab in S. Wendron church.

(b). *With expanded arms.*

Carnmenellis—In churchyard.

S. Wendron, (2)—Manhay, Trenethick.

Tintagel—Trevena.

On the *shaft* of the last named there are three crosses of this form remaining. There were four originally, one on each side of the inscriptions. The head of the cross in each case is at the bottom.

(c).

S. Buryan—Vallensajer.
Cury—In churchyard.
S. Day—Tregullov.

The two latter are varied by having the shaft narrowed suddenly from the lower limb, and widened at the bottom forming a kind of foot or stand. The example at Tregullov has the cross in *relief*, and the shaft *only* is incised, the only instance of the kind.

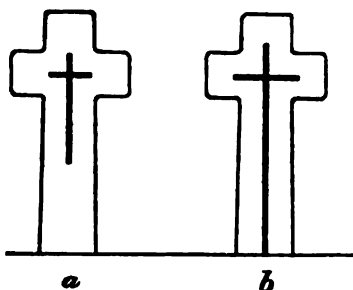
(d).

Constantine — Bosvathick,
Merthen.

S. Wendron—Merther Uny cross (on either front). On the N.W. side, the bottom of the cross, the shaft is expanded, forming a step or foot.

Incised Latin crosses are found on the *shafts* of the two following monoliths, (1), Trewardreva, (Constantine); (2), Lanivet, N. cross, (S. side middle panel, and E. front lower panel).

On Latin Crosses.



a

b

(a). *Short Latin Crosses.*

Blialand—Lavethan.
Temple—In churchyard (2).

(b). *Long Latin Crosses.*

Northill—Trebartha.
S. Neot—In Vicarage grounds
(2).

(3). *S. ANDREW'S CROSSES.*

Lanivet—In churchyard (N. cross, N. Side).
S. Dennis?—On W. and N. faces, at the bottom.

(4). *TAU CROSSES.*

Constantine—Nanjarrow (inverted).
Tywardreath—Menabilly.

The latter formed by one vertical and two horizontal lines.

(5). *PATRIARCHAL CROSSES.*

Temple—In churchyard.

(6). *MISCELLANEOUS FORMS OF CROSSES.*

Lanivet—In churchyard, (N. cross lower panel, W. front), a Latin cross, the three upper limbs having tau ends.

Constantine—Trewardreva.

Formed by one horizontal and two diagonal lines.

Towednack—In church porch, (cross slab).

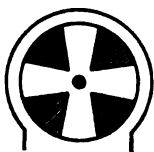
In the church porch of the last named is a rectangular stone which forms one of the seats. On it is cut,—what might be called a double Latin cross with expanded arms, formed by one line for the shaft, and the arms of the cross cut at both ends.

ORNAMENT.

(1). HOLES, AND PATTERNS
PRODUCED BY THEM.

Little sunk holes are used
either singly or in groups.

SINGLY.

(a). *An incised hole in the centre
of the cross on the head.*

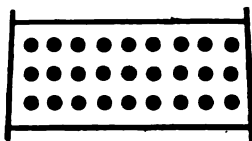
Bodmin—Callywith.
 Camborne—Trevu.
 Cardynham—Deviock.
 Constantine—Nanjarrow.
 Crowan—Clowance.
 Lanteglos by Camelford (2)—
 Trevia, Trewalder.
 Madron—Boswharton.
 Phillack—In churchyard (N.
 cross).
 S. Kew—Polrode Mill.
 S. Wendron—Merther Uny
 cross.
 Tywardreath—Menabilly.

The cross in the Market
Place at Penzance has a hole
in each of the projections at
the neck, and one in the middle
of the shaft just above them.

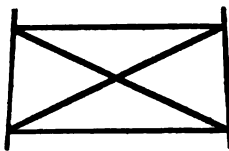
IN GROUPS.

Groups of little holes,
either in (1), Regular rows,
(2), Diagonal rows, or (3),
Indiscriminately arranged, are
cut on the shafts of the crosses.
The three different ways of
placing them occur in some

cases on the same stone. To
indicate which manner is
adopted, the numbers are
quoted after the name of the
cross. An illustrated example
of No. 1 only is given.



Gwinear—On Connor Down,
 (3).
 Lanivet—In churchyard, N.
 cross (1, 2, & 3).
 Madron—In churchyard (on
 cross base), 3.
 Roche—In churchyard (1).
 Penzance—In Market Place,
 (1).
 S. Wendron—Merther Uny, in
 old churchyard (1, 2, & 3).

(2). PATTERNS PRODUCED BY
STRAIGHT LINES.(a). *Square or oblong panels
with diagonal lines.*

Constantine—Trewardreva.
 Lanivet—In churchyard, N.
 cross (on S. & W. faces).
 Mabe—Helland.
 Madron—Boscathnoe.

This is the only instance
of a Latin cross being orna-
 mented.

S. Levan—In churchyard.
Three occur on the W.
front one under another.
The lowest one has double
diagonal lines.

Sancreed—In churchyard (on
N.E. & W. faces).

(b). *A variety of (a) without
the horizontal lines*

S. Day—Scorrier, in grounds,
(W. side, top).

(c). *Zignags.*



S. Levan—In churchyard (on
N. & ? S. sides).

Sancreed—In churchyard (on
N. side).

(d). *Variety of (c) without
joining the points.*

S. Day—Scorrier, in grounds,
(W. side, lower part).

(e). *Vertical straight lines placed
without regard to the forma-
tion of a pattern.*

(i). A line each side of,
and parallel to, the incised
shaft of the cross.

Carmenellis—In churchyard.

(ii). Similar to (i), and
further described in 3 (b), of
this analysis.

Mullyon—Pradannack (back).

(iii) similar to (i) without
the line of the shaft.

Temple—In churchyard (2).

(iv). The lower portions
of the cross shaft indicated by
incised lines, the rest of the
cross being in relief.

Constantine—Merthen.

Mullyon—Pradannack (front).

S. Hilary—In churchyard.

(f). *A single line down the
middle of the shaft.*

Cardynham—Deviack.

Crowan—Clowance. Termin-
ated at the bottom with
a diamond.

Helston—Mr. Baddeley's gar-
den (N. front).

Penzance—In Market Place.

S. Day—Scorrier, in grounds,
(on N. front and E. side,
the latter terminated each
end like a T).

(g). *Spandril lines in the head
of the cross, formed by two
lines at right angles, about
2-ins. from the lines of the
incised cross.*

Altarnun—Tresmeake bridge.

S. Wendron—Merther Uny
cross.

(h). *Miscellaneous ornament pro-
duced by straight lines.*

Constantine (2)—Nanjarrow,
Trewardreva.

Landewednack—Lizard Town.

Mullyon—Pradannack.

(3). ORNAMENT PRODUCED BY
CURVED LINES.

(a). *Foliated scroll work.*

S. Neot—"Four-hole cross,"
(on each front).

- (b). *Three quarters of a circle outside the encircling ring, the ends continued in straight lines to the bottom.*

Mullyon—Pradannack.

- (c). *Part of circle.*

Camborne—Outside the Institute (the lower portion broken away).

S. Day—Scorrier, in grounds (on N. front, bottom).

- (d). *Two segments of a circle (reversed and not touching) crossing the incised line of the cross shaft transversely.*

S. Wendron—Trenethick.

(4). REPRESENTATIONS OF OBJECTS.

- (a). *Circles.*



Mylor—In churchyard, one on each of the projections at the neck.

S. Day?—Scorrier, in grounds (S. front, bottom).

Sancreed—In churchyard (W. front), in the middle of the head.

- (b). *A Shield.*



Lanteglos by Camelford—Trevia.

Sancreed—In churchyard (on W. front).

- (c). *An hour glass?*



Crowan—Clowance (on each front).

S. Dennis—In churchyard (on N.W. & S. faces).

- (d). *Horse Shoes?*



Helston—In Mr. Baddeley's garden (two on each front).

- (e). *A Crosier.*

Lanivet—In churchyard (N. cross, W. front). A figure like a crosier. The crook of which nearly encircles the head of the cross on the lower panel.

- (f). *Vessel and Lily.*

Sancreed—In churchyard (E. front).

- (g). *Two elliptical rings placed crosswise.*

Lanivet—In churchyard, N. cross (on E. & W. fronts top panel).

- (h). *Plain incised panels.*

S. Cleer—On The "Other Half Stone" (on front).

S. Dennis—In churchyard (on S. side).

S. Wendron—Merther Uny old churchyard (N. side).

(5). MISCELLANEOUS FORMS OF ORNAMENT, THE MEANINGS OF WHICH ARE NOT CLEAR.

Altarnun—Tresmeake Bridge.
Boconnoc—In grounds.

On the shaft of the latter a device, consisting of two figures resembling square shaped C's with their ends turned in. Between them a Greek cross. Two feet above the cross are two trefoils side by side.

Lanivet—In churchyard, (N. cross, E. front. (Curious markings between the legs).

Madron—Trembath. (On the head).

(6). FIGURE ORNAMENT.

(a). *The figure of our Lord.*
Camborne—Trevu.

(b). *A man.*

Lanivet—In churchyard, (N. cross. The figure of a man in outline).

(7). MUTILATED MARKINGS TOO MUCH WORN TO DECIPHER.

Crowan—Clowance.

Helston—Mr. Baddeley's garden.

S. Breage—In churchyard.

S. Day—Scorrier, in grounds (on S. front, bottom, and side of same).

PART III.

MISCELLANEOUS ORNAMENT.

Under this last heading are included the different forms of ornament, which, as will be seen, cannot be said to belong to either of the two preceding divisions of Celtic or Incised ornament, and, as they are of an entirely different character, they must, on this account, be dealt with separately.

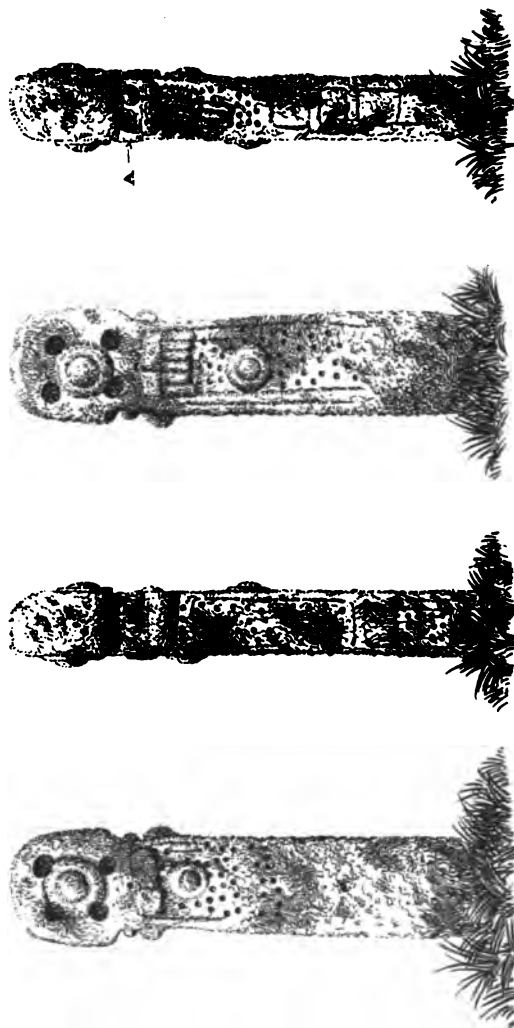
The varieties of this ornament are divided into four parts, viz., (1), Crosses, and patterns produced by flat sinkings; (2), Chequer work; (3), Patterns produced by bead mouldings; and (4), Crosses and ornament in relief. The ornament is all classified in the analysis, and on the information therein contained I must chiefly depend for the descriptions, giving as before, a detailed account of two typical examples. I trust by adopting this course, to convey to my readers a satisfactory idea of this curious class of ornament, interesting perhaps, rather from its peculiarity, than from its beauty.

The following is a list of 46 crosses, &c., which have examples of miscellaneous ornament and crosses upon them.

GEOGRAPHICAL DISTRIBUTION OF CROSSES WITH MISCELLANEOUS ORNAMENT.

- | | |
|---|---|
| (a). <i>On Pillar Stones.</i> | Penryn—Fish-market cross. |
| S. Wendron—Bodilly. | S. Buryan (3)—Boskenna-gate cross, Crowz-an-wra, Nun Careg. |
| (b). <i>On Wheel Crosses.</i> | S. Cubert—In churchyard. |
| Constantine (2)—Trevease, Nanjarrow. | S. Day—Tregullov. |
| Crowan—Clowance. | S. Feock—In churchyard. |
| Egloshayle (2)—In churchyard, Washaway. | Stythians (2)—In Vicarage garden, Trevalis. |
| Helston—Mr. Baddeley's garden. | Temple—In churchyard (2). |
| Illogan—In churchyard. | Tintagel (2)—Bossiney, Trevena. |
| Lanivet—In churchyard (N, cross). | (c). <i>On Wheel Crosses with projections at the neck.</i> |
| Lelant—In churchyard. | Egloshayle — "Three-hole cross." |
| Lewannick—Holywell. | |
| Mabe—Helland. | |

In Merther Uny old churchyard, S. Wendron.



Ant. Dingley
14 Sept 1894



Gwythian—In churchyard.
 Lanteglos by Camelford—In
 Rectory garden.
 Mylor—In churchyard.
 Perranzabuloe—On Perran
 Sands.
 Roche—In churchyard.
 S. Day—Scorrier, in grounds.
 S. Wendron—In Merther Uny
 old churchyard.

(d). *On Holed Crosses.*

Bodmin—Carminnow.
 Lawhitton—Trenifle.

Mawgan in Pyder—Lanherne.
 Michaelstow—In churchyard.
 Phillack—In churchyard.
 S. Buryan—In churchyard.
 S. Erth—In churchyard.
 S. Paul—On churchyard wall.
 S. Wendron—In churchyard.

(e). *On other crosses of different forms to the foregoing.*

Blisland—In village.
 S. Blazey—Biscovey.
 S. Dennis—In churchyard.
 Sancreed—In churchyard.

*THE CROSS IN MERATHER UNY OLD CHURCHYARD,
 S. WENDRON. Plate 6.*

Merther Uny, in the parish of S. Wendron, and deanery of Kerrier, is about 5 miles N.E. of Helston Railway Station on the G.W.R. S. Uny was an Irish saint who visited Cornwall, c. 460. The churches at Uny Lelant and Uni Redruth, are dedicated to him; also S. Uny Well, near the Land's End, and the original church at Merther Uny.

The cross occupies its original site near the S. side of the entrance to the old churchyard, and stands in a base, sunk about 18-in. below the ground. The base is broken across the middle. Mr. S. J. Wills¹ of S. Wendron was present in 1886 when the cross was refixed. During the necessary excavations for this purpose, portions of human bones and oak coffins were turned up, the latter in a very good state of preservation. The burying ground is now used as a vegetable garden.

This is another cross containing some very curious ornament, which deserves special description. It is a monolith with a quaint shaped head, rounded at the top, the sides being nearly straight, the angles are beaded, and there are projections at the neck. The ornament throughout is executed in a most irregular manner. The dimensions are as follows:—height out of the ground, 5-ft. 6-in., width of head (at widest), 16-in.,

¹ I am indebted to this gentlemen for the historical notes on this cross, as well as for those relating to the one now at Scorrier.

width of shaft, at the neck, 12-in., at the bottom, 14-in., and of a uniform thickness of 9-in. All four sides are sculptured as follows:—

East Front. On the head a central boss with encircling bead, adjoining which, and in some cases cutting through the bead, are four deep sinkings, $2\frac{1}{2}$ -in. below the face of the stone.

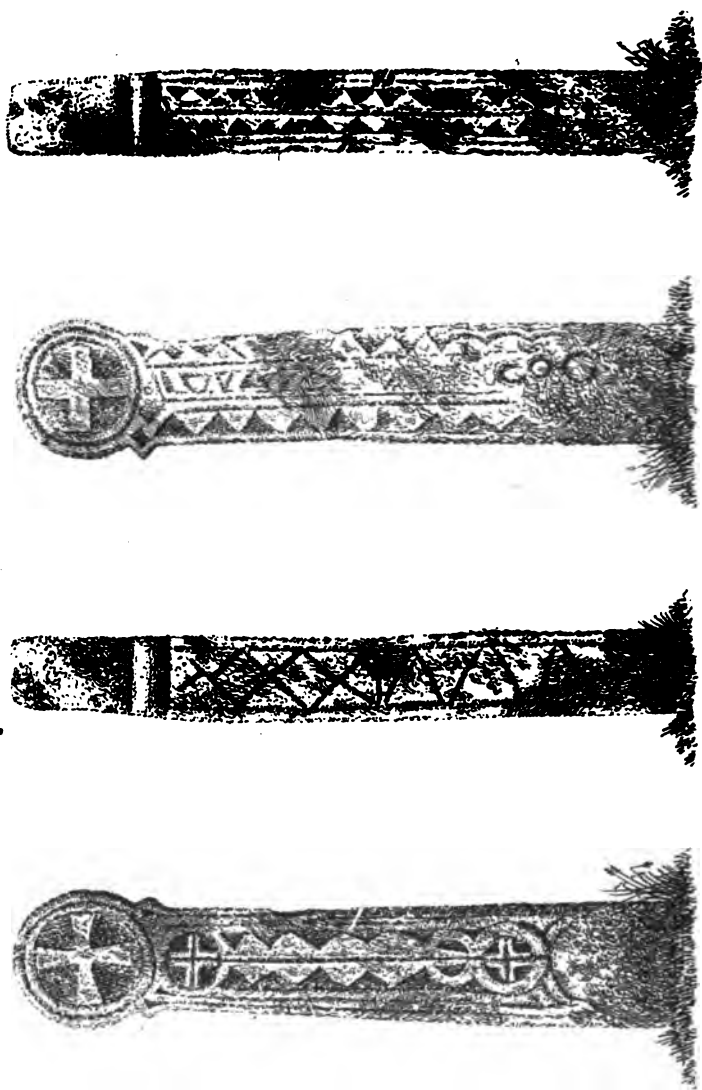
On the shaft at the neck, is an oblong projection between the beads of the angles. Above is a single small hole, and $1\frac{1}{2}$ -in. below this overhanging piece, is a boss, similar to that on head, but somewhat smaller. This portion of the shaft is decorated with small holes sunk in rows, sloping upwards from left to right, and extending to about 12-in. below the boss. The lower part of the shaft has some vertical groove markings.

North Side. No ornament on the head on either side. On the shaft at the neck a single boss, but not central. Below the projections at the neck, is a row of four little holes, and the remainder of the shaft is divided into four panels; (1), at the top a long panel of little holes, sunk as already described; (2), separated from the one above by a bead, is a plain square panel; (3), a panel consisting of four rows of little holes, three in a row sunk horizontally; (4), another bead and a plain panel.

West Front. With one or two exceptions this is similar to the E. front. Immediately below the oblong projection, is a row of six vertical beads in relief, stopped against the overhanging portion above, and having rounded ends. They are not of even length, being longest at the ends. 6-in. below them is a boss, rather larger and much lower than that on the E. front, and placed towards the N. side, which is double beaded. The back ground is ornamented with little holes indiscriminately placed to about 15-in. below the boss.

South Side. A very remarkable feature is seen here, showing how unforeseen difficulties or mistakes were got over by the primitive workmen. It will be noticed that at the point marked "A" on the drawing, a piece of stone has been left. If it had not been, the deeply sunk hole in the head would have come right through. The boss, I assume, to balance this, is placed near the E. side, instead of being central.

Scorrier. S. Day.



abt
eng

D

S

W

N

10 9 8 7 6 5 4 3 2 1

The shaft is divided into five panels; (1), at the top, a row of four vertical beads, similar to those on the W. front, but slightly curved at the top, below and touching the first three on the W. side, are three more beads, and the space which otherwise would have been occupied by them, had they been continued like the top row, is filled with little holes, as well as the lower portion of the panel. The remaining panels are quite plain, the two top ones only being separated by a bead. Where these do not exist, the division is formed by an incised line.

In concluding my description of this interesting cross, I would point out that it possesses characteristics which are found on only three other crosses, viz., a boss and bead on the shaft; a single boss at the neck; and in addition, it affords the only example of vertical bead ornament. The bead-work occurring on the sides of the cross in Roche churchyard is placed horizontally.

THE CROSS IN SCORRIER GROUNDS, S. DAY.—Plate 7.

Scorrier House is the seat of George Williams, Esq., D.L., J.P. It is situated in the Parish of S. Day or S. Dye, and Deanery of Carnmarth, and is about one quarter of a mile from Scorrier-gate Railway Station on the Great Western Railway.

The granite monolith formerly stood on the Rame tenement (originally included in the Parish of S. Wendron), at the junction of the road leading from Stythians to the Helston and Penryn Road. The ground was heathland, and a noted Celtic tumulus, since levelled, stood here. Rame has for generations been the property of the Williams family. About the year 1849, Mrs. Grace Williams, mother of Mr. Nicholas Williams (the present occupier), sold the cross for £5 to John Michael Williams, Esq., who removed it to the grounds at Scorrier, where it still stands. A notice, and very incorrect drawing of this cross is given in the Royal Institution of Cornwall Reports, 1849, plate IV. The drawing was copied in the following year by F. C. Hingston in his "specimens" of ancient Cornish Crosses, p. 35. This cross is stated by them to have stood "near the Half Way House."

This is a wheel cross with projections at the neck, the shaft has an entasis, and the angles are beaded. The ornamentation is most curious and rare, consisting almost entirely of chequer work, particulars of which will be found in my analysis. This kind of decoration is found on only two other crosses in Cornwall, viz., at Clowance, Crowan, and in Mr. Baddeley's garden, Helston. The only other example that I know of is given in Stuart's "Sculptured Stones of Scotland," and is to be found in the Minister's garden at Meigle.

The dimensions are—height out of the ground, 7-ft. 8-in., diameter of head, 1-ft. 7-in., width of the shaft at the top, 14-in., at the bottom, 16½-in. The cross is of a nearly uniform thickness of 11-in., but slightly narrowed at the head. All four sides are ornamented as follows:—

North Front. The elliptical head is double beaded, and contains a Greek cross in relief, with widened ends, and a small triangular sinking in each of the projections at the neck. The design on the shaft is not central, but placed towards the West side, and is bordered on that side by two beads, and on the East by three beads. At the top is a circle, with a plain Greek cross in relief within, having a groove cut across it at right angles, and carried down through the centre of the ornament, to the corresponding cross and circle at the bottom. Below the first circle is chequer work formed by five diamonds, with sunk triangular spaces at the sides. Between these, and the lower circle, are two segments of a circle, with sinkings in the middle. All the work in relief is flush with the face of the stone, the sunk work by which the pattern is formed, is about ¼-in. to ⅓-in. below. At the bottom of the design, is a segmental bead running into those at the sides.

West Side. There is no ornament on the head on either side. On the shaft is some irregular chequer work, formed simply by incised lines; below are some roughly executed zigzag lines.

South Front. The head on this side is round and double beaded, containing a plain Greek cross in relief. The projections at the neck have, on the West side, a square sinking, set diagonally, on the East side is one of triangular shape. On the West side of the shaft is chequer work reaching nearly to

the bottom, then a vertical bead, and the rest of the shaft is ornamented with chequer work which is somewhat mutilated. On the lower portion of the shaft are some curious circular markings and beadwork.

West Side. On the shaft is a double bead on each side, with a panel of chequer work between, having a deep groove cut down the centre, and terminating top and bottom in a forked end

ANALYSIS OF MISCELLANEOUS CROSSES AND ORNAMENT.

- (1). CROSSES AND PATTERNS PRODUCED BY FLAT SINKINGS.

(a). *Crosses.*

(i). GREEK CROSSES.

S. Buryan (2)—Crouz-an-wra,
Nun Careg.
S. Wendron—Bodilly.

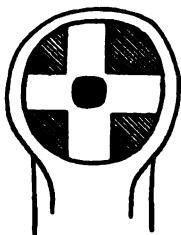
(ii). LATIN CROSSES.

Temple—In churchyard (2).

(iii). S. ANDREW'S CROSSES.

Constantine—Nanjarrow.
Mabe—Helland.

- (b). *A square or round sinking in the centre of the cross in place of a boss.*



Illogan—In churchyard.
S. Cubert—In churchyard.
S. Dennis—In churchyard (on E. front) a round hole is sunk on either side of the incised cross in the head.

- (c). *Four round sinkings in the cross-head in place of four bosses.*



Roche—In churchyard.
S. Wendron—Merther Uny old churchyard.
Stythians—In Vicarage garden.

- (d). *Two sinkings in the head.*

Phillack—In churchyard.

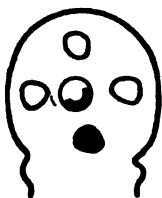
The two lower holes on this cross are not pierced right through like the upper ones. There is about one inch only left in the middle.

Stythians—In Vicarage garden.

On the S. side of this cross, on the head, are two round sinkings, one on each side of the top limb of the cross.

The holes in both these examples are placed in the same position as in a four holed cross.

- (e). *One sinking in the cross head in place of a pierced hole.*

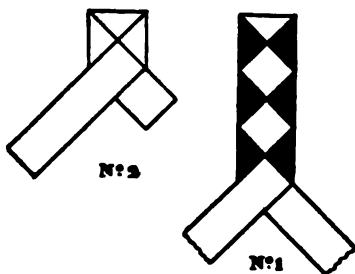


Egloshayle — "Three hole cross."

Perranzabuloe — On Perran Sands.

The above are both 'Three holed crosses.' The holes are placed differently from a 'Four holed cross,' which will be seen by comparing their positions in the last two blocks.

(2). CHEQUER WORK.



This is a very curious ornament, resembling a sort of flat twist which (I discovered by accident), could be formed by folding a strip of paper continuously as shewn

in No. 1, commencing in the same manner as adopted in folding a small note shewn in No. 2.

In executing this pattern on the stone, the triangular pieces at the sides are sunk about half an inch. The central diamond work is kept flush with the surface of the stone. In all cases a groove is cut down the middle. There are three examples in Cornwall as under.—

Crowan—Clowance.

Helston — Mr. Baddeley's garden (N. front).

S. Day—In Scorrier grounds (on N.S. and E. faces).

An instance of this work is found on a cross in the Minister's garden at Meigle.

The chequer work on the N. side of Scorrier cross is terminated top and bottom by a nearly completed circle in relief, having two segmental sinkings within.

(3). PATTERNS PRODUCED BY BEAD MOULDINGS.

- (a). *Concentric circles, consisting of a bead or beads, worked round a central boss. The following examples occur on the shafts of the crosses.*



Lanivet—In churchyard (N. cross, N side).

Mabe—Helland.¹

Mylor—In churchyard (on each front, and has two beads outside the boss).

S. Wendron—Merther Uny old churchyard² (on each front).

(b). *Concentric semi-circles, the diameter on the edge of the stone.*

Crowan—Clowance.

(c). *Vertical beads in rows.*

S. Wendron—Merther Uny old churchyard (on W. and S. faces).

(d). *Horizontal beads in rows.*



Roche—In churchyard (on E. and W. sides).

(e). *Miscellaneous beadwork.*

Blisland—In village. The bead of the rounded head is returned square beneath the cross in the head.

S. Buryan — Boskenna gate cross. The bead of the head returned square at the bottom, but not carried across the stone like the example above.

(4). CROSSES AND ORNAMENT IN RELIEF.

Bosses.

(a). *A single boss in the middle of the head.*

Eglosayle — "Three hole cross."

Gwythian—In churchyard.

Helston—Mr. Baddeley's garden (on N. front).

Lelant—In churchyard.

Perranzabuloe — On Perran Sands.

Tintagel (2)—Bossiney, Trevena (front enriched by a quatrefoil sinking).

They also occur on all four holed crosses, except at S. Tudy, and as a rule have a bead worked on the outside.

(b). *Five bosses on the head.*

Those marked thus* are without any other ornament.

Bodmin*—Carminnow.

Lanteglos by Camelford*—In Rectory garden (on each front).

Mawgan in Pyder—Lanherne.

Phillack—In churchyard.

S. Buryan*—In churchyard.

S. Erth*—In churchyard.

S. Paul*—On churchyard wall.

S. Wendron*—In churchyard (on each front).

Tintagel—Trevena (front).

(c). *A single boss on the sides of the cross at the neck.*

Phillack—In churchyard.

S. Wendron—Merther Uny old churchyard.

¹ & ² In these instances the head and boss project before the face of the stone.

(d). Two bosses as above.

S. Day—Tregulrow.

Two bosses occur in the interlaced work on E. front of Water-pit Down Cross on the shaft.

(e). A Heart.

Stythians—Trevalis.

(f). A fleur-de-lis.¹

Egloshayle—Washaway.

(g). Crosses.

Constantine — Trevease; on front a patriarchal cross in relief, the legs of the Figure resting on the top bar.

Egloshayle—In churchyard, a chamfered Latin cross in relief with a bead passing up the centre, the cross stands on an oblong projection.

Lewannick — Holywell. On either side of this wheel cross, is, what is termed in heraldry, a "cross pateé fitché" in relief.

S. Feock—In churchyard (on S.E. front) a foliated Gothic cross, in relief.

S. Wendron—Bodilly. On a square shaft with rounded top a cross formed by the four triangular spaces between the arms being in relief instead of sunk, the cross thus formed being flush with the face of the stone.

Sancreed—In churchyard (on S. side top).

There are some curious forms of crosses worth noting. At Sennen, S. Levan (2), S. Michael, S. Minver, in the churchyards, are crosses in relief of the form most common in Ireland, i.e. the arms are the same width to about half way from the centre, and are suddenly widened, and splayed at the ends.

(h). Projecting bands.

Lawhitton—In Treniffle garden. A four-holed cross head, with a boldly projecting bead round the neck.

Michaelstow—In churchyard, exactly similar to foregoing.

Penryn—Fish-market cross (the cross of the head stands on a rounded necking 4-in. deep, and the width of the shaft).

S. Blazey—Biscovey. A rounded band 3-inches deep, encircling the shaft midway.

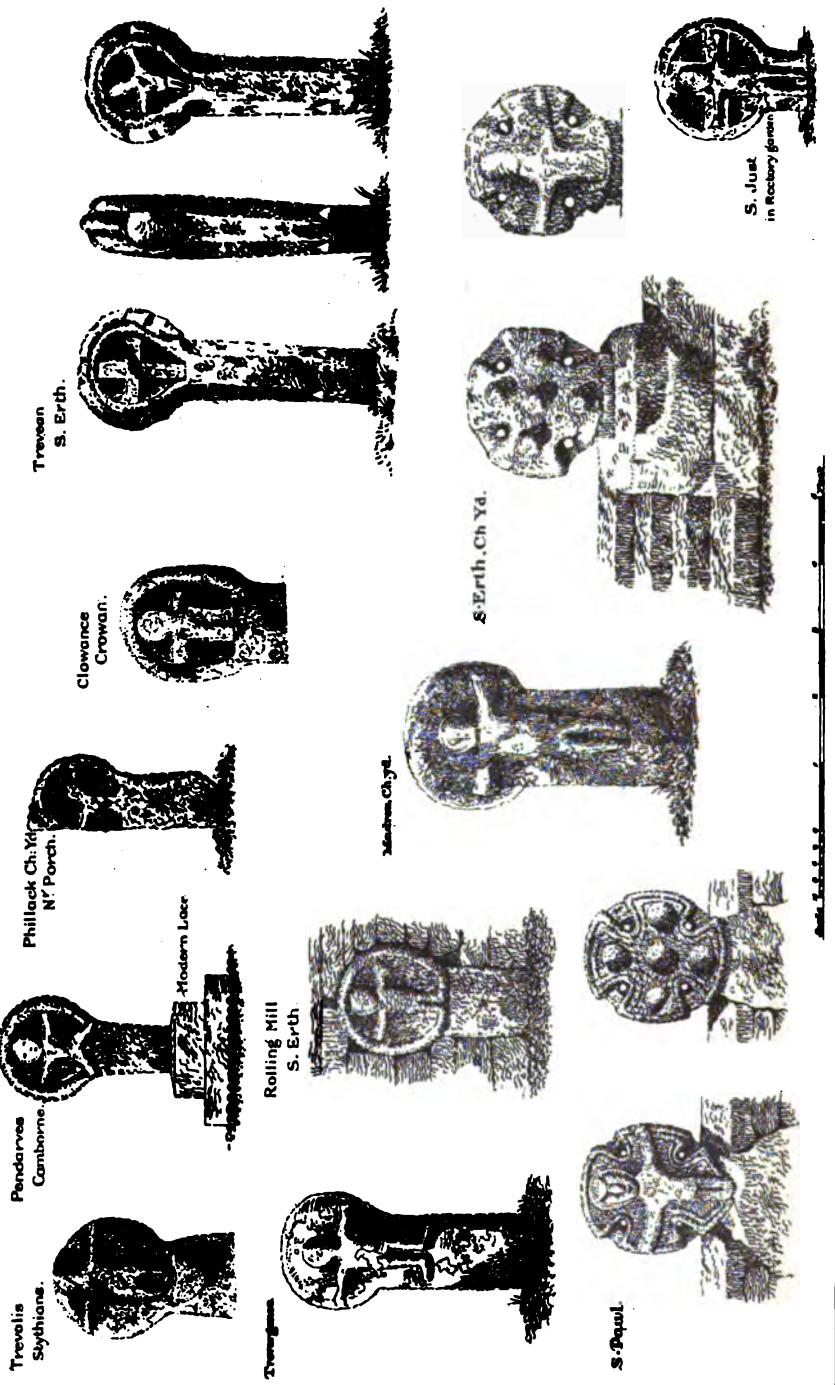
S. Day—Tregulrow, in grounds (a splayed band 4½-in. wide round the lower part of the Shaft, 12-in. above the ground).

S. Dennis—In churchyard (a square band or collar round the neck).

(i). Miscellaneous ornament in relief.

S. Wendron—Merther Uny in old churchyard (on either front, a rectangular projection).

¹ I failed to make out anything resembling a fleur-de-lis on the cross in Egloshayle churchyard as shewn by Sir John Maclean, in his "Deanery of Trigg Minor," vol. 1, p. 406.



PART IV.

*SUBJECTS CONNECTED WITH THE CROSSES.**FIGURE SCULPTURE.¹—Plate 3.*

Many of the crosses in Ireland, as well as numbers of those in other parts of Great Britain, are profusely decorated with figure sculpture, such as human figures illustrating scenes from the Bible, birds, beasts, fishes, &c. In Cornwall, however, the examples in this style of ornament are extremely limited, and with few exceptions are confined to a rudely executed representation of the Saviour's form, in shallow relief, rarely exceeding a projection of $1\frac{1}{2}$ inches. His figure is not only posed in a variety of different ways—but, as will be seen—the legs, or the feet, are sometimes entirely omitted.

I have at present collected 37 examples of the Figure. The following is a list of the places where they occur :

GEOGRAPHICAL DESCRIPTION OF THE CROSSES WITH THE FIGURE
OF OUR LORD SCULPTURED UPON THEM.¹

(a.) <i>On Wheel Crosses.</i>	Phillack—In churchyard (near S. porch). ²
Camborne—Pendarves, Trelothan ? ²	S. Day—Scorrier (ingrounds).
Constantine—Trevease.	S. Erth—Rolling Mill.
Crowan (2)—Clowance, Praze-an-beeble.	S. Feock—In churchyard.
Gulval—Rosemorran.	S. Just-in-Penwith—In Rectory garden.
Gwinear—In churchyard.	S. Levan—In churchyard.
Lelant—In cemetery (2).	S. Michael's Mount—West side.
Madron—In churchyard.	Sennen—Trevelley.
S. Buryan (3)—In churchtown, Boskenna cross, and Tre-vorgance.	Stythians (2)—Repper's Mill, Trevalis.
	Zennor—In Vicarage garden.

¹ Mr. J. T. Blight illustrates three examples which I have been unable to find, viz., Clowance, Stythians, and near Boskenna.

² The cross has lately disappeared.

- | | |
|---|--|
| <p>(b.) <i>On Wheel Crosses, with projections at the neck.</i>
 Camborne—Outside Institute.</p> <p>(c.) <i>On Holed Crosses.</i>
 Mawgan-in-Pyder—Lanherne.
 Phillack—In churchyard.
 S. Buryan—In churchyard.
 S. Erth—In churchyard.
 S. Paul—On churchyard wall.</p> | <p>(d.) <i>On Latin Crosses.</i>
 Mawgan-in-Pyder—Mawgan cross.
 Newlyn (Penzance)—On hedge (N. side of church).
 S. Buryan—Chyoone.</p> <p>(e.) <i>On other forms of Crosses.</i>
 S. Erth (2)—In churchtown, Trevean.
 Sancreed (2)—In churchyard, by Vicarage gate.</p> |
|---|--|

The different ways in which the Figure is represented may be classified as follows: (1), sometimes He is shewn clothed in a tunic with the limbs straight, and the head and body unbent, after the Byzantine fashion of depicting Our Lord alive upon the cross. The bottom of the tunic is well defined, and the sleeves are widened at the ends like the expanded arms of a cross hiding the hands. Examples of this kind are found at the following places, four of which are in the parish of S. Buryan, viz.:—in the churchyard, in the churchtown, Boskenna cross, and Trevorgance; also in the Rectory garden, S. Just-in-Penwith; Lanherne; Sancreed (by the Vicarage-gate), and in the churchyards at the following places, Madron, Phillack, S. Levan and Sancreed.

(2). With a band round the waist.—Sancreed, by Vicarage-gate.

(3). The Figure *on* a cross.—Trevilly (Sennen), and S. Just-in-Penwith.

(4). The example at St. Michael's Mount is the only one which occurs on the *shaft* of the cross, in all other cases they are sculptured on the *heads* of the crosses.

(5). Only one incised example.—Trevu.

The mediæval manner of shewing the dead Christ on the cross was introduced in the twelfth century, and became common in the thirteenth.

The other varieties, in the treatment of the Figure, will best be described by taking the members separately.

The Head. In the majority of instances the head is perpendicular. Seven examples occur where it is inclined to the *right*, viz.: at Repper's Mill, Scorrier, Trevean, Trevease, Trevilly, Zennor; and on the taller cross in Lelant cemetery. Two are inclined to the *left*; Chyoone and Phillack (near the porch).

Three are shewn with what is probably a *nimbus*. Sancreed (by Vicarage-gate), S. Buryan and S. Paul churchyards.

The features remain on three only, viz., Sancreed churchyard, S. Paul, and Pendarves.

The body. In some cases it appears to be naked, in others it is shewn either very full, like the plump body of a child, very thin, or in one or two examples somewhat contracted at the waist, and with hips like a female figure, as at Repper's Mill, Trevalis, and Praze.

The arms. The arms are perhaps more freely treated than any other member. In many cases they are both raised slightly, and much higher than usual, on the crosses at St. Feock, S. Michael's Mount, Rosemorran, and Mawgan Cross. Occasionally only one of the arms is raised, *e.g.* at Scorrier the *right* arm is bent at right angles, at Zennor it is also raised. At Phillack (by the porch), Lelant cemetery, and Trevean, the *left* arm is raised.

The legs. As a rule the legs are quite straight and close together. There are, however, four exceptions, three of which occur in the parish of Camborne, viz.:—at Pendarves, outside the Institute, and Treslothan? Also on S. Michael's Mount. At Pendarves the spread of the legs is exaggerated to an impossible extent; at Trevean, the legs are close together, and curved to the right, and are omitted in the following examples:—Clowance, Phillack (by porch), S. Erth churchyard, and Zennor. In the three last-named crosses, the space all round the figure within the ring is sunk, and the body is stopped flush with the face of the stone at the lowest part of the sinking, making it evident that this was all of the Figure which it was intended to depict.

The feet. In the straight unbent Figures the feet are very long in proportion to the figure, and are turned out at right angles to the legs. It is a noteworthy circumstance, that the five

examples best illustrating this, all occur in the parish of S. Buryan, viz., in the churchyard, in the churchtown, Boskenna cross, Trevorgance, and Chyoone. The feet are best proportioned on the crosses at Phillack churchyard and Sancreed (by the Vicarage-gate), and are omitted on the following crosses, Pendarves, Treslothan? and outside the Institute (Camborne); Rosemorran, Scorrier, Trevease, S. Erth churchtown, and S. Feock. Occasionally the feet rest on a projection, or rather, the bottom of the legs die on to it, as at S. Levan, S. Michael's Mount, and Sancreed churchyard. At Rolling Mill they are worked into the bead of the ring; at Trevalis into a heart; and at Trevease on to the top of a patriarchal cross in relief.

On the N.W. side of the cross at Lanherne, is a dragon with a serpentine body which passes up the panel, and in returning fills the spandrils with continuous Stafford knot-work, terminating at the bottom in the mouth. Altogether this panel is probably the most beautiful specimen of interlaced work in Cornwall. There are only two other similar examples of the above design; one is on a coped stone at Bexhill, Sussex, and the other at Aycliffe, Durham. On the W. side of the cross in S. Breage churchyard, on the stump of the shaft, are the remains of what appear to be the head of a dragon, similar to that at Lanherne. Finally, there is the unique example on the wheel cross at Trevean (S. Erth), deserving special notice. On the front is the Figure of Our Lord, on the back a Latin cross in relief. On each side of the cross is a human head, having the chin on a level with the junction of the shaft and head. The heads are connected by a bold bead passing over the top of the cross. The bead and heads are therefore a feature, quite separate and distinct, and form an addition to the usual shape of a wheel cross.

THE AGES OF THE CROSS.

This paper would be incomplete without some reference to the ages of the crosses upon which the ornament exists. Too much caution, however, cannot be exercised in dealing with this vexed question. The fact is, that we have really no direct information regarding their erection, though perhaps this might be taken in favour of their great antiquity. In Ireland the dates of

many of the Celtic monuments have been ascertained by identifying the names contained in the inscriptions upon them, which correspond with those mentioned in the ancient chronicles of the country. But in Cornwall, only one supplies us with any hint suggestive of its date. This is the inscribed and ornamented cross base at St. Cleer, standing by the side of "The Other Half Stone." The inscription is,

doni
ertr^o
gavit
proan
ima

"Doniert rogavit pro anima," *i.e.* "Doniert has requested (prayers) for his soul."

The same sentiment is frequently expressed on ancient tomb stones in the words of S. Monica, "I care not where you lay my body, but this only I ask, that you remember my soul."

Camden says, "As for Doniert, I cannot but think he was that Prince of Cornwall whom the chronicles named Dungerth, and record that hee was drowned in the yeere of our Salvation 872." At all events, there is nothing improbable in accepting this date, as the style of the ornament and character of the lettering in the inscription, indicate that it is of about this period as regards age. Under these circumstances, this information is especially acceptable, since it gives us some sort of chronological guide in reference to other stones, with similar ornament upon them, which, in consequence may be taken as belonging to about the same period.

The first clause in the will of Dr. Reginald Mertherderwa, Principal of Bull Hall, in Oxford, and Rector of Creed, dated Feb. 11, 1447, sets forth that "New stone crosses (are) to be put up, of the usual kind, in those parts of Cornwall from Kayar Beslasek to Camborne Church, where dead bodies are rested on their way to burial, that prayers may be made, and the bearers take some rest." The above seems to give a very late date to some of the crosses, at any rate it goes to prove that even in mediæval times these crosses were still erected, and remembering how far Cornwall was even in those days from centres of

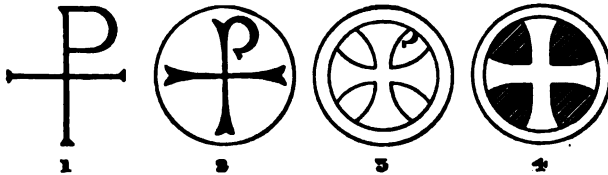
more advancement, it may be, that its crosses like its architecture were much later than in other places, but seeing that no particular *kind* of cross is specified in the will, I am inclined to think that it did not refer to the sculptured stones.

THE SYMBOLISM? OF THE ORNAMENT.

We will now touch briefly on certain architectural or ornamental features of the crosses, which are associated by some people with symbolism. My own opinion is, that they are simply what I have just described them to be, and that when they were designed, no symbolism whatever was intended.

In the first place, there are no ancient books or MSS. which have any bearing on the particular points in question, consequently we are without historical evidence regarding them. Secondly, the position of these ornaments on the crosses themselves, seems to me to be opposed to the theory that they are emblematic.

The cross itself is, of course, the Symbol of our Faith. We will now examine separately some of the details described as mystic signs.



(1). *The Circle*, or ring of a cross, as an emblem of Eternity. It has been shewn that the cross was developed out of the Chi Rho monogram,¹ enclosed in a circle. A study of the above diagrams, copied by permission, will make this clear.

There is, however, no evidence to shew that the circle was intended to represent Eternity. The sign above was in very general use in the East as a kind of seal, carved on the lintels of the doors, and is also found on a number of sarcophagi.

¹ "Early Christian Symbolism," p. 94, J. Romilly Allen, F.S.A., Scot., London, 1887.

Again, what is now called the circle of the cross, is not actually a circle at all—though it is a *survival* of it,—but, is in reality composed of four quadrants.¹ A true circle in that position, and divided by the arms, always looks very flat. This is noticeable in modern monuments. Finally, the addition of these quadrants to a cross, serves to strengthen the arms considerably, and, by keeping them within the extremities, a better effect is produced, and the cross itself, stands out as it should, *the main feature*.

(2). *The Triquetra knot*, an emblem of the Trinity. There are many examples extant, of very unevenly shaped stones, which are covered with beautiful interlaced work. I now refer more particularly to cross bases. On these, the elaborate ornament is so arranged, that it fills up the whole of the irregular space,² irrespective of geometrical form. In designing the decoration for a cross-head, there were awkwardly shaped spaces left on the arms, which required to be filled in, and it appears to me, that it was very natural, for these competent masters of their art, to design a special knot to fill the special space.

(3). *One boss*, the emblem of the Godhead. The middle of the cross is the most important point of the decoration, which centres there. To mark this still more, the boss was most likely introduced, as an effective and easily worked ornament.

(4). *Five bosses*, emblematic of the Five Wounds. There are six crosses in Cornwall which have five bosses on the head, but are without any other ornament whatever. Their presence may I think be accounted for thus, that having adopted the central boss, the simplest and most effective way to complete the ornamentation, was to introduce one more into each of the remaining spaces on the arms, or, in those examples where the crosses are decorated with interlaced work, and have the five bosses in the head, the workmen may not have been competent to execute on the granite the more delicate ornament requisite for so small a space. Lastly, why represent five wounds—which are *holes*,—by five bosses which are projections?

¹ At Prideaux Place, Padstow, the arms of the cross are connected by straight pieces instead of quadrants, the whole head forming an octagon. This unique example is well worth notice.

² See also N.E. front of Lanherne cross, shewing how the interlaced work fills up the bottom of the head.

The attempt to discover symbolism where none was meant, seems to be an innovation of comparatively modern times. It has indeed been carried to such an extent, that I was seriously told on one occasion, that the four holes of a cross represented the four Evangelists! This, I think it will be admitted is going a little too far. On the whole then, I am inclined to think, that a system of Symbolism has been developed out of the ornament, and not that the ornament was originally founded on Symbolism.

*THE DIFFERENT PURPOSES FOR WHICH SOME OF THE
CROSSES, &c. HAVE BEEN—OR ARE—UTILISED.*

I cannot lose this opportunity of publicly calling attention, by a few remarks, to the desecration of some of our ancient monuments. It may at first appear that this is a digression, but I feel sure that the *preservation* of our priceless relics, demands serious consideration.

Everybody knows, that one of the chief characteristics of Cornwall is its *crosses*, scattered about as they are all over the county, and therefore of general interest to all. A glance however at the subjoined list, which I know falls very far short of the total numbers, will best illustrate the very utilitarian purposes to which the crosses, &c., are applied, and will shew, that alas! there is but too much ground for these few lines of appeal. Can nothing be done to rescue these relics while there is yet time? or are they to "perish miserably" where they stand? If some of the influential landowners would only take the matter up much good might be done, and the expenses attached would not be very considerable. Col. S. G. Bake of Camelford, has set a good example in restoring the Water Pit Down Cross at his own expense, and if others will follow his example, and continue the work of rescue, they will find ample material at their service as the number of stones still "on duty" will shew, most of the instances named having come under my own notice.

Mr. J. R. Allen, whom I have already quoted, makes the following observations on the way in which we allow our monuments to be treated. He says "It may be worth while remarking, that no other nation possesses such a wonderful series of monuments, illustrating the history of Christian art, at one of its most obscure periods, and probably no other nation

would have treated them with such scorn, or allowed them to be so ruthlessly destroyed. Many of these priceless treasures have been lost altogether, others have been damaged by persons ignorant of their real value, and the whole are perishing miserably from exposure to the weather. Casts or at least photographs should be taken before every trace of the sculpture has disappeared. This is the more important as many fragments which have been preserved for centuries by being built into the walls of churches, are being brought to light from time to time in the course of modern restorations and alterations, and these are now also in many cases exposed to the weather. A gallery of casts of Celtic sculptured stones would be invaluable for purposes of archæological research, and might be the means of reviving the national taste for the art of sculpture in which our own countrymen at one time attained so high a standard of excellence."*

A list of the different purposes, for which some of the Cornish crosses, inscribed stones, &c., have been, or are, utilised.

An asterisk denotes that the stone is still "on duty."

Usage.	Class of monument.	Place where it exists.	Parish.
(1). AGRICULTURAL.			
Gate Posts.	Inscribed cross.	Castledôr.	S. Clements, Truro
	" "	Trevena.	Tintagel.
	" " shaft	Biscovey.*	S. Blazey.
	" stone.	Treveneage.*	S. Hilary.
	Cross.	Connor Down.*	Gwinear.
	"	Trevia.*	Lanteglos by Camelford.
N.B.—Dozens of others bear the holes for the hinges.			
Pigs' Troughs.	Cross head.	In Vicarage garden.	Altarnun.
	" "	In churchyard.	Leasnewth.
		(The W. side was hollowed out to suit this purpose.)	
Prop to a Barn.	Inscribed Saxon Stele.	In Rectory garden.	Lanteglos by Camelford.
	Wheel cross.	Trevalis*	Stythians.
Rubbing posts set up in fields.	Many are still used for these, some having been removed for this duty.		

*"Early Christian Symbolism," p. 82.

A pivot for a gate. Four holed cross head. In Cemetery. S. Teath.

A pivot for a thrashing machine. Interlaced shaft. Water Pit Down. Minster.

(2). BUILDING PURPOSES.

Built into a bridge.	Inscribed stone.	Bleubridge.	Gulval.
Built into hedges.	Cross head.	In churchyard.	S. Mabyn.
	Four holed head.	Treffry turnpike.	Lanhydrock.
	Cross.	Trevellan.*	Luxulyan.
Built into walls.	Four holed cross.	Trenifle.	Lawhitton.
	" " "	Dr. Marley's garden.*	Padstow.
	" " "	In churchyard.	Cardynham.
	Interlaced shaft.	In the church.*	S. Just in Penwith.
	Cross head.	E. chancel wall.*	Camborne.
	Cross head and its interlaced shaft.	In churchyard	Cardynham.
	Inscribed stone with Chi Rho monogram. ¹	In gable of S. Porch.*	Phillack.
	Inscribed stone.	Rialton.*	S. Columb Minor
Copings for walls.	Interlaced cross.	In churchyard.	Quethiock.
	" "	In Cemetery.	S. Teath.
Wall plate.	Interlaced shaft.	By Vicarage gate.	Sancreed.
Flying buttress.	Cross.	In churchyard.	Mylor.
Credence table.	Inscribed stone with Chi Rho monogram. ²	In the church.*	S. Just in Penwith.
Steps to doorways.	Cross slab.	In church.*	S. Wendron.
	Cross.	Colquite.	S. Mabyn.
Steps in flights.	Four holed cross.	In churchyard.	Michaelstow.
Stepping styles.	Cross.	No man's land.*	Lanlivery.

(3). MISCELLANEOUS.

Foot bridges over leats or streams.	Wheel cross.	Polrode Mill.*	S. Kew.
	" "	Pemberth.*	S. Levan.
	" "	Outside church-yard.	Sennen.
	" "	Milltown	Lostwithiel.

¹ * * There are only five examples of the Chi Rho monogram in Great Britain, of which Cornwall has two, unfortunately the third found at Helen's chapel, Cape Cornwall, has disappeared. The other monuments bearing the monogram are in Wales, Penmachno; in Scotland, Kirkmadrine (2). Two others formerly at Whithorne (Scotland), are missing. There are no examples in Ireland.

Cover for a well.	Wheel cross.	In field off Castle Street.*	Bodmin.
Stand for sundial.	Inscribed and ornamented altar slab.	Pendarves.*	Camborne.
A seat.	Incised cross slab.	In porch.*	Towednack.
For forming iron wheel tires on by blacksmiths.	Cross.	Rectory garden.	Lanteglos by Camelford.
Adopted for boundary stones of parishes (and duly beaten).	Four holed cross. Wheel cross.	Carminnow.* Callywith.*	Bodmin. Carminnow.
Adopted for boundary stones of private property (disfigured by initial letters of holders).	The "four-hole cross." Cross. Hewn pillar stone	Temple Moor.* Peverell's cross.* Bodilly.	S. Neot. Blisland. S. Wendron.
Adopted for a directing post.	A cross.	Near Newquay,* between that place and Perranzabuloe.	
Adopted for bench marks by ordnance surveyors.	Many monuments are disfigured by the broad arrow, as the "Four-hole cross," &c.		
Broken up for road metal.	There are several cases on record, in which crosses, &c., have shared this fate.		

The foregoing list contains some magnificent monuments, notably, Biscovey and Pendarves. The former possesses some beautiful examples of knot work, and the latter has a key pattern border.

The custom of removing the crosses, and erecting them in private gardens, &c., cannot of course be recommended, though it has been the means—to a great extent, of preserving some of them. On the other hand, I think the churchyard is the place for them, where they may be seen by all. In the case of sculptured stones, however, they should be placed in the churches, as is done at other places, and thereby be protected from the weather.

Generally reviewing the ornament on the crosses of Cornwall, we cannot fail to be struck by three circumstances connected with it. (1), The rudeness of its execution; (2), the great difference in the character of the work compared with that

in other localities, as shewn by the many unique examples of its detail; and (3), a charming quaintness, and appearance of age, on many of the stones. This seems to give a special interest to them, as if to compensate for the superior design and workmanship on other crosses far way, where the art was more fully developed, and brought nearer to perfection.

In making for a county a classification of the ancient sculptured ornament, which, so far as I am aware, has never been previously attempted, one is met with difficulties at the outset. More especially is this so in a district like Cornwall, where, as I have just remarked, the ornament in many cases is so entirely different from that found in other places. New terms have to be applied to hitherto undescribed sculpture, and a particular system must be adopted in the arrangement of the analyses, &c., for which there is no precedent. But though some parts of this paper have been of necessity curtailed, the lists of the stones and the analysis of each Part have been dealt with most fully, and the details of the ornament, of however small and apparently insignificant a nature, which occur on any of the 115 crosses, &c. contained in my list, have all been carefully classified, for, as the quality of the ornament can only be judged by the care with which its detail has been designed and executed, and is generally the only guide by which the antiquity of the work can be safely inferred, it is evident that the importance of a careful study of detail cannot be too strongly urged.

There may possibly be other sculptured stones which have escaped my notice, and have thus been omitted. Should this be the case, I shall be obliged if any of my readers, who know of their existence, will communicate with me respecting them.

With reference to the three analyses, there are a few points which I wish to be thoroughly understood. (1), That in them is included all that is known to me, on the stones which I have seen and drawn. (2), That while in some instances there exists only one known specimen of the example illustrated, it must be borne in mind that there *may* be others, as these monuments are still frequently found. In which case, the details of the newly discovered stones can simply be added to their respective sub-divisions and thus preserve a record of them all. (3), In

order to enable any person interested in the crosses to form a correct idea of their ornamentation, without actually having seen them. For example, by consulting the analysis of Celtic ornament the whole of the work on the S. Neot shaft is at once apparent, as well as the position in which the ornament is found upon the stone itself.

Further, that the nomenclature of the different forms of monuments, is given here according to their *shape*, and *not* according to the kind of cross upon them. It is for example, very misleading, (at least I have found it so) to call a 'round-headed cross' a "Latin cross," simply because there happens to be a Latin cross upon it (a system adopted by one author). I maintain that the architectural features of the stone itself, should decide its class, and *not* the kind of cross with which it is ornamented. Thus the term "wheel cross" is simply a name, suggested by the architectural *shape* of a particular kind of monument, locally known as a "round-headed cross," which consists of a rectangular shaft surmounted by a round head. The name is therefore quite independent of any ornament which may exist on either the shaft or the head.

In a case of this kind where there is practically no historical or documentary evidence, we must be content (for the present at least) to deal with the facts before us, and avoid dangerous and unfounded speculations. On this account I have felt the necessity for my remarks on Symbolism, and on the dates of the stones, chiefly in the latter case were they necessary, because I know that one gentleman at least (who shall be nameless), is given to a playful way of dating all the crosses from about the second to the thirteenth century, according to his own sweet will, *but* without the slightest foundation.

I have throughout, been most careful to avoid fanciful theories, and in every case have quoted the authority for my historical information, strictly confining myself to those authors, who, by their special study of the matter relating to Celtic ornament, have made themselves most capable of dealing with the subject, and whose opinions are therefore most valuable.

In conclusion, I have only to add, that my great object has been to make this paper one which will be convenient for

reference to those who are inclined to pursue this interesting study. It is because I have felt the subject to be one so important that I have spent so many months in attempting to provide something like a reliable work on the Crosses of Cornwall.

For any inadvertent inaccuracies in the information I have given, I can but ask the indulgence of my readers. Should the methods I have adopted commend themselves to those who share my interest in the crosses, I hope at a time not far distant, to produce a more complete work, my aim being, not only to deal with the ornamentation, but to give a full classification of the stones themselves, the whole fully illustrated.

To all who have followed me in the outlines I have given, the desire to supply all that remains will be at once appreciated. For myself, any further time or labour will be willingly spent in pursuing the subject, and in collecting the necessary material for completing a volume on the early "Christian Monuments of Cornwall," of which, we, as Cornish folk, may well be so justly proud.

CORNISH CHOUGHS.

By THE REV. A. H. MALAN, M.A.

It is much to be feared that future generations will find it an extremely difficult thing to come across these interesting birds in the county from which they take their name. Considering their former plenitude, their present scarcity is not an altogether easy matter to account for. Several reasons have been suggested :—

(1). Jackdaws swarming round the cliffs, harrying and usurping their nesting places.

(2). Trapping and shooting in former days.

(3). Robbing nests, and taking young and eggs. All of these have doubtless contributed to reduce their ranks. But I venture, in connection with them, to suggest another reason ;—

(4). In and in breeding. Not being migratory birds in the general sense of the word (though all birds are migratory to a certain extent), it stands to reason that being restricted to the cliffs, and not being found in the inland districts of Cornwall or Devon, any strolling gunner would know just where to find them, and any egg-collector would know where to seek for eggs; and that as their colonies became thinned by these means, there would be fewer opportunities for the survivors to find fresh alliances in the way of mates. The introduction of fresh blood would therefore be highly desirable; and this I have endeavoured to bring about. For (through the introduction of that well known ornithologist, Lord Lilford), the genial manager of some zinc mines, in the mountains of Spain, J. P. Woods, Esq., F.Z.S., most kindly volunteered, a few years since, to obtain for me "any number of red-legged Choughs, entirely free of cost," to turn loose on our Cornish cliffs. And indeed his promise was so far fulfilled, that he caused some adult specimens to be caught by the miners; and then (as these proved difficult to keep alive), had several nestlings reared, and held them in readiness, awaiting a favourable chance to send them over; but being called away on business to Morocco, they all perished in his absence, through neglect of some assistant. Since

then, Mr. Woods having removed down to the coast, has been no longer on the spot to superintend their capture among the mountains of Santander; but when he last wrote, he assured me his promise still remained in force, though he was unable to appoint a time when it would be discharged.*

The South Coast of Cornwall is now entirely deserted by Choughs, and the only remaining colonies are found at intervals on the side facing the Atlantic; the greater proportion of the birds being (most unfortunately) met with in the immediate neighbourhood of T——, where several young ones are annually taken, and find ready purchasers among the summer tourists. Being remonstrated with, and advised to leave at least two young ones in every nest which he rifled, so that the future existence of these birds may not be seriously jeopardised, a cliffman propounded this conundrum:—"The last man who took Cornish daws, was killed over cliff twenty-five years ago; how is it that, being left undisturbed all those years, they have not increased?" The answer to which was, of course, that if they *had* been left undisturbed (which is open to extreme doubt), though they might not have increased in that particular district, yet the progeny would form fresh colonies elsewhere. Attention to the Wild Birds' Preservation Act was forcibly drawn, a year or two ago, by placards being posted in and about the village of T——; the consequence of which has been that the cliffmen are rather shy of appearing to possess young birds before the 1st of August; but as this Act does not prohibit the taking of *eggs*, (Choughs' eggs always fetch a good price), it is not so useful as it might well be; and moreover, on reading the Act in question, the cliffmen determined to circumvent it, by taking the eggs, hatching them under pigeons, and then rearing the young by hand. Whether they have done this is unknown; but even if not, they still contrive to obtain fledged nestlings, by, if not before the first of August. It is a thousand pities that any passer-by who happens to be in Cornwall, and deems it a fine thing to possess a Cornish Chough, should be *able* to buy

* In a subsequent letter, dated Dec., 1889, Mr. Woods writes—"I will do my best to send you some young red-billed choughs. The yellow-billed are more common, but both, I understand, build their nests at the sides of the deepest shafts in the mines, and in the natural caverns which abound in the heights."

these birds in this way; for it is extremely unlikely that the purchasers are familiar with their ways; and the chances are that the birds will be confined in some aviary, or else, with clipped wings, permitted to mope away a few months' miserable existence, in a backyard or about the garden of their owner, and then terminate their lives before their first year is expired. And therefore it is fortunate that *some* of the nests about T—— are situated in such inaccessible spots, that they are beyond the reach of the most fool-hardy and experienced climber, even though let down from above by ropes.

The free wild temperament of Choughs will not brook any confinement, but must have absolute liberty, and full exercise for their wings. If this is not the case, they generally get an attack of asthma, which usually proves fatal, in their first year. One of my present birds had a bad attack of that ailment, several years ago, when it was young, induced by the foolish clipping of one wing; and it was only brought through its illness by a liberal use of curry-powder with its food,—a known remedy for trained falcons, when suffering from affections of the throat. To shelter it from the damp outside air, this bird was permitted to sleep during its first winter, in my study; and though at liberty to choose any spot, it used invariably to select a corner of the mantelpiece, close to the large wheel of a cage of Harvest mice: which wheel, being busy at work most of the night, and generally containing a piece of almond, or small fragment of biscuit, might well, by its noise, have been supposed to interfere with the slumbers of the invalid, but apparently did not. In time the attack was thrown off, and then, with every pinion perfect, the bird began to enjoy life; it has never had a trace of any sickness since, and it is now in the most robust health. It should be mentioned, in passing, as an interesting thing, that this same bird subsequently contrived to break off the tip of its upper mandible (by no means wonderful, considering that a chough must always be pecking at something, the harder the material the better); and for a long while the opposite mandible overlapped the broken one, so that the beak did not present a uniform point, but somewhat faintly resembled that of a cross-bill. However the bird managed to wear down the longer one, and now the two mandibles meet perfectly, and

are as right and true as though ground together on a grinding-stone. This rather militates against the theory that a bird with a broken beak is unable to rectify matters; but probably the material of which beaks are composed, varies much with the nature of the work required from them, and so one bird may be able to wear down the overlapping part of a broken bill while the opposite part is renewing itself by growth, though another bird may not be able to do the same thing.

Everyone has seen a chough, if only in a museum; and therefore knows the beautiful glossy black of the adult plumage, the long wings crossed over the back and extending beyond the squared tail, the long slender red legs and the brilliant red curved bill. It is perhaps needless to remark that the usual museum attitude is eminently unlike that generally assumed in real life. The beak and legs of the birds of the year are tawny orange; and do not assume the sealing wax red colour until after their first moult.

But only those who have kept them, know their marvellous docility. You may train a falcon, whether eyass or haggard, [*i.e.*, young bird or wild-caught adult] to sit on your wrist, and come down to the lure, with infinite labour; but to a chough brought up from the nest, it comes quite natural to be at one moment flying high in air—it may be, hotly pursued by a party of rooks, and leading them a merry dance, since being long winged birds, choughs hold the rooks, crows, and jackdaws very cheap, inasmuch as these baser creatures can never come near enough to injure them—and the next, to come in at the open window, alight on the table, or jump on one's knee, and sit there any length of time, absolutely still, while its head and back are stroked with the hand, or a pen: combining the complete confidence of a cat or a dog, with the wild freedom of the swallow. No other bird with which I am acquainted, thus unites the perfection of tameness with the limitless impetuosity of unreclaimed nature. It is a pretty sight when walking a mile or two away from home, to hear the clear ringing call, and see two black specks in the sky, come down in long undulating sweeps, with wings alternately closed and spread, and alight at

your feet, or perch on a gate, and follow at your bidding; and then, if startled by a stranger, to see them fly off with a nervous scream, as though they had never seen a human being before!

Living thus, and at liberty by day, of course these birds will support themselves, finding their natural food in the way of small beetles, woodlice, earwigs, centipedes, &c.; but wholly refusing slugs, worms, and snails. Like hawks, and owls, and crows, they throw up casts of the indigestible carapaces of the beetles, &c.

A very favourite feast are grubs of the crane-fly, which they extract from the grass in spring; first picking at some selected spot, and probing with closed bill to make a hole (walking round the while, and working with a twisting motion until the hole is large enough to admit the beak), and then nipping the grub, which appears to be beneath at the exact distance of two inches from the surface. It is surprising the number of grubs which will thus be secured in a small patch of newly mown lawn. The only supplementary food supplied them, consists of some scraps of meat, mixed with bread, potatoes, and gravy, and the whole chopped finely; and this is more than they often care to pick at, though it serves as a kind of lure to "alock" them into their shed at night, and thereby prevent their becoming completely insubordinate. They have three notes, (a) the usual call note, clear and ringing, and perfectly distinct from that of a jackdaw; (b) the cry of alarm, which is the same sound as the former only pitched in a higher key, emitted in rapid succession when a hawk is viewed above head, or when the chough is startled by a sudden noise; (c) a harsh, chiding, repeated sound, as of an animal in some pain, made use of when a rat or cat is perceived skulking in the grounds, or when one of the choughs is seized by the hand, and another resents the insult. Always noisy, always active, in boisterous spirits, they have such exuberant energy that frequent sham fights, perilously near the real thing, are wont to take place; occasionally when feeding, or walking together, one will suddenly turn on his back and put himself in fighting trim, while his opponent sets to and attacks him, with beak and deliberate grip of claw, and with every evidence of determined hostility: the next

instant they fly away in perfect harmony, and are always inseparable companions. But how it is that their eyes escape injury when at the sparring matches is truly remarkable. Like other birds at roosting time they become especially quarrelsome, making a tremendous noise; and if the friendly hand be *then* put near them, with hissing lunges of disapproval, heads down, tails up, they thrust and lunge as though they had never suffered the same hand to stroke or caress them before. At all times they are sensitive creatures with very highly-strung nerves; and the smallest occurrence out of the common startles them immoderately.

They are said not to perch on trees. This is not correct; they frequently do so on bare exposed branches; and occasionally join the rooks on the summits of the tall elms; but only for a second or two, preferring the ridge of the roof, or the coping of a wall, or other stone support on which to rest their feet.

I am not aware that Cornish choughs have ever bred in semi-captivity. The male is much larger and stronger than the female; the plumage is identical in both sexes. My own birds have attempted nesting every year, but have never laid eggs to my knowledge; though the yellow-billed variety (*Pyrrochorax Alpinus*), has certainly nested more than once in the aviaries at Lilford.

“And are you not afraid of their being shot, as they go so far afield?” is a question often asked. Well one *is*, extremely so; and it is surprising that such a fate has never befallen them. It speaks much for the goodwill and forbearance of the parish sportsmen that they have never,—say when these birds have been feeding with rooks in the arish or plow, had a shot at them: of course any stranger seeing birds fly by him, such as he had never seen before, might naturally try to secure them, and fire at them with that end in view, without any blame attaching to the action: when one hears of their being seen on the moors, and of persons enquiring what birds they are, one trembles for their safety: and for all one knows, they may have had many a hair-breadth escape. Yet if such should be their fate, it would be satisfactory to feel that they had enjoyed life to the full, and known no cares; always sure of a warm shelter by night, secure

from draughts and rain, and impregnable to cats and other foes ; and had never been at a loss for a meal, which is probably more than their wild congeners could say, in a hard frost.

The only adventures, so far as I know, that my own birds have experienced, are the following. When I lived at Perranarworthal, one of them—then a young bird, which had been caught wild, and not reared by hand—was somewhat lawless, and would not always come home to roost, though usually it would follow its elder comrade home from the fields. And one night a poor old woman was going up to bed, who, when she reached her room, just caught a glimpse of some black object perched on her bedstead, which dashed past her with an unearthly scream, and vanished out of the open window, leaving her in a state of trepidation and astonishment, easier to imagine than to describe. Shortly after, the same bird managed to entangle some worsted thread round its legs, the ends of which thread got caught in a thorn bush overhanging a small pond, so that the bird was nearly “killed and drowned”; it was luckily rescued by a native, who chanced to pass by, carried to his home, and put in durance vile in a dark outhouse. Thanks, however, to that publicity which is one of the features of village life, whereby the most trivial circumstance befalling anyone is immediately known to every other member of the community, the following day I received news of the whereabouts of the captive ; and on going to bring it back, was gravely informed by the captor, with a sweet simplicity in things ornithological, that he thought it was a moorhen. Since then, this bird has grown older and wiser, and is now as tame and shrewd, and canny, as his companion.

In the British Isles these birds are almost always found exclusively along lofty and precipitous cliffs. Yet this rule is not without exception, seeing that some have recently nested in a quarry on a mountain side in Wales ; in this instance resembling their foreign allies, thousands of the red-legged, and also yellow-legged kinds, being met with in the mountains of Spain, far from the sea-coast, and vast quantities being also found, it is said, in Egypt. Though scarce in Cornwall the Cornish chough is not by any means an uncommon bird in certain parts of the coasts of Great Britain ; a large and flourishing colony,

wholly unmolested, for example, existing at the present date quite close to a well known watering place in the Principality. This shows that the Cymric Celt, unlike his Cornish cousin, is not so mercenary as to place every young bird which can possibly be captured in the way to mope out a brief and unhappy existence, in the keeping of any Jack, Tom, or Harry who will provide the necessary price; but is good and kind enough to allow the old birds to rear their young in peace: echoing that sentiment and desire of every true lover of birds, which is, or ought to be—*Floreat Pyrrhonorax Graculus*.

POSTSCRIPT.—Since the above was written, the same bird which met with the previous mishaps, has fallen into more serious trouble. On January 8th, he contrived to catch the toes of his right leg in some wire netting against the stable window, and when twisting round his body to extricate himself, snapped the bone at the fleshy part of the drumstick. When the disaster was discovered the same evening, the limb was hanging straight down with toes closed; the bird was standing on the other leg, evidently in great pain, and such immediately indicated that the bone was fractured. Prompt treatment was necessary; and the method adopted is here recorded, as possibly useful to some reader for reference.

Complete quiet was of course essential, if the bone were to have any chance of setting; and therefore a large darkened cage was provided, into which the other chough was also placed, to keep the sufferer company. Four splints were hastily cut out of a deal, hollowed on the inside to the shape of the leg, with the ends cut to a point, where they would meet just above the knee; pitch was melted and applied to the inside of each strip—plaster of Paris would, perhaps, have been better, but none was at hand—and while a servant held the bird with a handkerchief folded round its body to prevent injury to the wings, the splints were placed over the wound so as to embrace the leg, and tightly bound round with tape, over which a coat of melted resin and beeswax was applied. Peck as he might, by no possibility could the bird now either shift the splint or move his leg; and dieted on sponge cake soaked in milk—he wholly refused meat and even insects—so he remained till the 13th, when his incessant

restlessness indicated excessive pain and probable inflammation. An examination therefore was deemed desirable, and accordingly made; half of the leg being laid bare by removing with a sharp knife, bit by bit, every thing down to and including the feathers: an operation not without its comical side, for the servant holding the bird was suddenly taken faint when it was about half done, and a fresh domestic had to be summoned, and then it was discovered that the greater part of the flesh was brown and flacid, and the rest tense and swollen; in fact mortification seemed imminent.

No time was accordingly lost in applying a bandage of linen wetted with dilute nitric acid (one dram to the pint), replaced as often as it became loose, and moistened with the lotion. Two days of this treatment rendered matters considerably more hopeful; the leg resumed its normal temperature; the gangrenous part became more circumscribed, and a healthy patch of flesh appeared below the wound; the other half of the splint, which stuck "like pitch," meanwhile being sufficient to prevent any sudden jerk from separating the ends of the broken bone.

On the 18th, a bandage of arnica was put on, and some of the tincture sprinkled over the food. On the 20th it was conjectured that if the bone intended to join at all, it had probably already done so; and since the sooner all pressure was removed, the sooner all inflammation would cease, it was decided to take off the other half of the splint. This proved a work of no small difficulty, but when at last it was safely accomplished, the pleasing fact was established that the bone had united. Gradually life seemed to struggle into the limb, and a powerful relief it was to the patient when, by the 24th, he could rest his right foot, even with toes doubled up, on the perch, and so take some of the body-weight off the long-ago exhausted left leg.

From this time, progress was both rapid and satisfactory; full use presently came back to the joints of the foot; the bird was permitted once more to fly, and shew that in spite of much handling, his wing feathers were all sound; within a month from the date of the accident his recovery was complete; and though the right leg is now a trifle shorter than the left one, he no longer favours it in any way, has quite forgotten all about his injury, and—as he well deserves to be, for his docility and patience under suffering—is as hale and hearty as ever.

THE TREASURE SHIP OF GUNWALLO.

By H. MICHELL WHITLEY, F.G.S., Hon. Sec.

On a fine summer morning, there is no fairer sight on the Southern coast of England, than that from Newlyn, of Mount's Bay, and S. Michael's Mount, and beyond, stretching dimly into the haze, the long level line of the Lizard. Beautiful then as the scene is; in a winter's gale from the south-west, there is no more deadly death trap on the whole coast of England, than this soft looking dim line of shore: as the remains of many a good ship wedged firmly into the crevices and fissures of the caverns attest.

Of all the wrecks, however, which have taken place on this iron-bound coast, there is none that has excited more interest than the wreck of the Spanish Dollar ship in Gunwallo Cove.

The story runs, that about a hundred years ago, a Spanish ship laden with dollars was wrecked there, and that ever since that date, dollars are from time to time washed up on the beach.

No clear idea appears to exist, as to how much silver was on board; the estimates of different writers, varying between $2\frac{1}{2}$ and 19 tons; figures curiously precise in themselves, but widely apart in weight.

It seems to be the general opinion, that when the ship struck she overturned, and upset the dollars into a cavity in the rock, where they were quite covered by sand, and only after great storms are they disturbed, and washed on shore.

This being the accepted story, it is not to be wondered at, that attempts have from time to time been made to discover the buried treasure, especially in 1845 and 1872,—and perhaps later—by cofferdams, mining, divers, and other appliances, but so far the results have been of the most barren description.

I have not been able to inspect any of these dollars which have been picked up, and am therefore unable to state what date they bear. It is however a curious fact, that amongst some old papers at the Public Record Office, I have found an account of the wreck of a Portuguese treasure ship at Gunwallo Cove in the 18th year of King Henry 8th (1526), more than 250 years before the date given in Tradition.

It is thus a curious coincidence that two treasure ships should have been wrecked at the same spot.

However, this may be, there can be no doubt as to what the Portuguese ship contained; for a careful inventory drawn up by the King of Portugal's factor is still extant.

It appears from his statement, that in January, 1526, a ship called the Saint Andrew, belonging to the King of Portugal, freighted with Bullion, Silver Plate, and other treasures, sailed from Flanders for Lisbon, but by "outrageous tempest of the sea," was driven ashore at Gunwallo; and there utterly perished; although as Francis Porson (the factor before mentioned) states, "by the grace and mercy of Almighty God, the greater part of the crew got safely to land," and not only so, but he states that, assisted by some of the inhabitants, they saved a great part of the cargo, and this was extremely valuable.

It comprised amongst other things :

Eight thousand cakes of copper, worth £3224; Eighteen blocks of silver bullion, worth £2250; silver vessels, plate, ewers and pots, pearls, precious stones, chains, brooches, and jewels of gold; together with a chest of ready money containing £6240.

Then there was cloth of arras, tapestry, rich hangings, satins, velvets, silks, chamlets, sayes, satins of Bruges, and Flemish and English cloth.

Then the most curious entry of all occurs, twenty-one hundred barbers' basins, and following it 3200 laten candlesticks; a great chest of shalmers and other instruments of music, four sets of armour for the King of Portugal, and harness for his horses, etc.; the whole amounting to more than £16000 in value, equal to about £150,000 in present money. Porson—in his declaration—goes on to state, that shortly after they landed: Thomas Seynt Aubyn, William Godolphin, and John Milliton arrived on the scene, with about sixty retainers, armed in manner of war with bows and swords, and made an assault on the shipwrecked sailors, and put them in great fear and jeopardy; and eventually took from them all they had saved from the wreck, amounting to £10,000 worth of treasure, which they will not return, although they have been called on to do so.

But a different complexion is given to the affair by the account written by Thomas Seynt Aubyn himself.

In this he states that being in the neighbourhood of Gunwallo he heard of the wreck, rode to it and assisted in saving the men ; Godolphin and Milliton afterwards joining him with the same object ; and in endeavouring to save part of the cargo, one of the men was drowned.

They found that very little could be rescued, and seeing that the men were destitute, without money to buy meat or drink, they bought the goods of the ship in lawful bargain with the captain.

They further deny any assault, or that they took goods to the value of ten thousand pounds from the sailors, in fact they only saved about £20 worth altogether, the bulk lying in the ship still, and although they tried to recover more, they failed even to pay for the cost of the labour they employed.

So the two stories run, but it is probable the latter is the true one ; and that the rich treasure of the King of Portugal, still lies buried beneath the sands of Gunwallo Cove, perhaps—who knows—to be found on some future day. Be that as it may be, it is a romantic story, and takes one back to the days of

“Sails of silk and ropes of sendel,
Such as gleam in ancient lore,
And the singing of the sailor,
And the answer from the shore.”

ON THE ORIGIN AND DEVELOPMENT OF ORE DEPOSITS IN THE WEST OF ENGLAND.

By J. H. COLLINS, F.G.S.

INTRODUCTION.

General remarks on the origin, formation, and alteration of *rock-masses*.

Early condition of the Globe. If we provisionally accept the nebular origin of the earth as a convenient and probable working hypothesis, we may regard it, in its early stages, as a globe of partly liquid, partly solidified rock-magma still mingled with and evolving various gases and vapours, and surrounded with a dense atmosphere of a similar nature.

As cooling continued, not only would this atmosphere be increased by emissions from the newly-formed globe, but a more or less complete solid shell would at last be formed on the surface of the mainly liquid nucleus. The existence of this shell or "crust," commonly regarded as rigid but really somewhat flexible, elastic, and plastic, may be considered as due, firstly, to the gradual separation of the specifically lighter portions of the molten mass under the influence of gravity, and secondly, to the cooling and consequent solidification of those portions.*

Now, since by the hypothesis, the cooling is constantly in progress, and cooling results in a lessened volume, the solidified crust, at first formed while floating on the molten mass beneath, would, after a time, be left without support other than its own (imperfect) rigidity, and would begin to subside. The result would necessarily be a series of contortions, for, as Mr. Wilson has clearly shown, "contortions are the inevitable result of the subsidence of a curved surface."† Furthermore, general subsi-

*It may be remarked, as a general rule, that rock-substances of *low* are mostly less fusible than those of *high* specific gravity.

†See J. M. Wilson, *Geol. Mag.*, 1885, p. 206. Mr. Wilson has mathematically investigated this subject, and shewn that the known rising and sinking of large areas of the earth's surface is *adequate* to produce such faultings and contortions as are observed.

dence may produce local elevation, for "as soon as the resistance offered by the descending mass becomes greater than that offered by the stationary parts of the earth's surface, on either side of the descending area, the enormous pressure will tend to relieve itself by the rise of any part or belt of country where the amount of resistance is least."* Thus, paradoxical as it may appear, depression may actually be the immediate cause of regional elevation.

If the elevations were produced by pressures from below, as, for instance, from the expansion of a gas, we might expect the production of a dome, or of a single ridge. But, it is well known that "axes of elevation" are generally bounded on one or both sides by crumpled and contorted rocks, forming parallel systems of anticlines and synclines, and these are plainly produced by lateral pressures. The pressures exerted by the subsidence of large areas of the "crust" being constant, will, given sufficient time, be transmitted to considerable distances laterally through the somewhat plastic rock-material, until these once more are supported below—hence the crumplings of strata which are often observable for hundreds of miles on one side or other of a great mountain range. The shell first formed, therefore, and to a continually diminishing extent all later additions to it, would be subject to contortion and ultimate fracture from the effects of gravity.

But it is conceivable and even probable that elevation may, in some cases, result from local heating of the rocks not connected with subsidence. Such a local heating of a part of the earth's crust, 50 miles thick, from a mean temperature of 600° C. up to a mean temperature of 1000° C., would produce, by expansion of the rock substance, an elevation of between 1000 and 1500 feet. The cooling down of the same mass would lower the surface by the same amount.† By such agency we might explain the gradual rise of part of Scandinavia, or the subsidence of Greenland.

**Ibid.*

†There are, of course, other causes known to Geologists, which are also competent to produce local elevation and subsidence.

This local heating, however produced, (and several not improbable modes might be suggested) would be sufficient, in some cases at least, to melt off the lower portions of the solid crust if it had been previously bent down into folds or "sags" by large additions to its weight. What was before especially thick would now be rendered especially thin. Thus would result a local weakness sufficient to determine the *locus* of a system of contortions resulting in more definite elevations, especially if conjointly aided by gaseous accumulations. By the pressure of the related subsiding portions of the crust upon the underlying molten mass, the rising folds of the contortions would be filled by injections of portions of this mass. If the pressure were great enough to rupture the crust the fracture might be repaired by the solidification of the injected matter. The frequent existence of ridges of plutonic rocks along lines of elevation indicates, either that they were actually so extruded in a fused state *through* the fractured crust, or that, having filled and occupied rising folds and arches in the contorted rock-crust, they are now exposed by denudation.

To rightly apportion the work done by subsidence and elevation respectively, in any particular case, must always be difficult, if not impossible—especially as their effects are complicated by variations in density, occasioned by local heating—by the rock-material passing from the solid to the liquid state, and *vice versa*—by condensation of rock-material under pressure—and by changes of volume in passing from the amorphous to the crystalline state. It is indeed doubtful whether there has ever been any real elevation of any considerable part of the earth's surface—it may well be that the apparently elevated areas are not really more distant from the earth's centre than before, but only seem to be so, owing to the actual subsidence of the surrounding regions. Such questions, though of great theoretical importance, have little or no practical bearing on our present enquiry.*

*This question of the causes and effects of elevation and subsidence, and of contortion, has been discussed very ably by Prof. C. Lloyd Morgan, in the *Geological Magazine* for May, 1898. After discussing the effects of lateral pressure in forcing the "upper layers" of the earth's crust into long goodlines, and the consequent effects of the altered pressure of the rocks on the magma

Reference has been made to the dense atmosphere surrounding the globe in its early stages. The more condensible vapours of this atmosphere would be rapidly and continuously precipitated on the newly formed crust, in proportion to the progressive lowering of the temperature, partly as solids, more largely, in all probability, as liquids; and so the first separation of land, sea, and sky would result; each somewhat resembling their present counterparts, each, no doubt, differing in many important particulars, yet subject to the same general laws. With solid, liquid, and vapour in juxtaposition, gravity would of necessity gather the liquids into the low places to form seas, in which there could not fail to be, as now, tides and currents. The atmosphere would be violently agitated by storms, and the elevated portion of the dry land would be fractured by unequal contraction and expansion, worn away by heavy rains gathering into torrents and rivers, dissolved by corrosive fluids, and broken up by electric and crystallizing forces. All these phenomena might be expected to prevail precisely as at present, only with greatly higher intensity; and the detrital deposits so formed, mingled with and consolidated by chemical precipitates from the highly-charged waters, would form the first truly stratified deposits.

Such early sediments, formed under such conditions, would of necessity differ greatly from those formed at later periods, when the earth, sea, and sky had all become considerably cooled down, their youthful energies, so to speak, moderated; but, though in all probability highly crystalline, they would be true sedimentary rocks notwithstanding, and subject to the same mechanical and physical laws as their latest successors.

Various origin of rock-masses. All rock-masses when first formed may be regarded as original, although their materials may have been derived from pre-existing rocks. It will be

beneath, he observes that the data at our disposal are at present too scanty to positively determine any of the shares quantitatively, and concludes, "Who shall presume to assign quantitative shares (+ or —) to (1) contraction due to metamorphism in the solid underlayers, (2) expansion of the rocks under increment temperature, (3) formation of geoclines (linear systems of folding and contortion) by lateral pressure, (4) contraction and expansion on melting and solidification, (5) effects of pressure on the water-gas contained in the fluid magma, (6) the differential load on a flexible crust."

convenient to consider original rock-masses ("deposits") under the following heads, according to their origin:—

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| 1. Sedimentary. | 4. Æolian. |
| 2. Organic. | 5. Volcanic. |
| 3. Chemical. | 6. Plutonic. |

(1). The sedimentary deposits will differ from each other according to the nature of the materials of which they are composed; thus they may be argillaceous, calcareous, or siliceous; homogeneous or heterogeneous; fine-grained or coarse-grained, &c., while, according to the conditions under which they have been deposited, they will be compact or laminated. In their first stages it is probable that sedimentary rocks always appear as mud, clay, sand, or gravel, and after alteration, as shale, slate, sand-stone, conglomerate, marble, mica-schist, &c., &c.

(2). The principal organic deposits are coral reefs and coal beds, though there are others which consist largely of organic accumulations and secretions. Coral reefs form immense compact masses, sometimes roughly bedded, sometimes not. Coal is usually distinctly bedded. Chalk may be regarded as an organic rock, because its chief constituents have formed parts of organisms, but in its mode of deposition it is essentially a sedimentary rock.

(3). Chemical deposits, such as travertin and siliceous sinter, are, in the later geologic series, frequently connected with mineral springs; but beds of rock-salt, gypsum, &c., are distinctly lake deposits, and many of the Archæan rocks have probably originated in a manner combining both kinds of phenomena.

(4). Æolian deposits, or deposits of drifted sand, are of considerable importance in some regions, as in the recent fossiliferous sand-stones of Guadaloupe and the sand-dunes of the North Coast of Cornwall, some of which are consolidated into real sand-stones of considerable hardness and durability.

(5). Volcanic rocks, such as obsidian and tachylite, trachyte and basalt, which have been ejected in a fluid state from volcanoes, are examples of this class. The first two are glassy, while the third and fourth are largely or completely crystalline. Vesicular structure is common in obsidian and trachyte, rare in basalt and

tachylite. Tachylite is unknown in the West of England, but many of the intrusive rocks of the East of Cornwall, although now much altered, appear to have been basalts.

(6). Plutonic rocks are such as have been consolidated from a melted or partially melted condition at considerable depths beneath the surface. Granite and gabbro are *holocrystalline*, i.e. they are composed entirely of crystals of various minerals, which have been formed, if not simultaneously, yet very nearly so; felspar-porphry, quartz-porphry, and a great many other rocks consist of a ground-mass either of minute crystals or of crystalline particles, in which are distributed larger crystals of distinct minerals. Such a structure is *porphyritic*. A third condition is what is known as *micro-crystalline* or *crypto-crystalline*, in which the whole substance consists of minute but ill-defined crystalline particles, as in the case of the elvan dykes of Trelaver and St. Dennis Downs. There is, however, reason to believe that this is not an original structure, but rather that it has been subsequently developed from a *vitreous* condition of the rock.

Rock-change in relation to mineral deposits. With rocks originating in so many different ways, under widely different conditions, and with their materials drawn from such very different sources, we may expect that the subsequent developments will also be various. We are now in a position to study some of the developments, in so far as they relate to ore-deposits and to their containing rocks.

The changes which are continually going on in rock-masses from the first moment of their formation are of great importance to the miner. The object of the present writer is to summarise and classify such observations, whether original or made by others, as are specially related to the origin and development of mineral deposits in the West of England—a region notable for the variety and extent of its rock-changes.

The chief directions in which these changes of rock operate in favour of the miner are the three following, viz: in preparing convenient sites or resting-places for the minerals, in making channels by which they may be brought within his reach from below, and in concentrating such valuable substances as are sparsely distributed to such an extent as to be worth working. Many examples of each of these lines of operation will be given

in their appropriate places. Rock-change also acts beneficially in economic geology apart from mineral deposits, as in converting sand into sandstone, limestone into marble, and felspar into kaolin; but these changes hardly come within the scope of our present subject.

As these remarks may be read by some who have not as yet entered on the study of Physical Geology, it will be necessary to state a few main facts by way of preparation, and these may be conveniently put in the form of axioms as follows :—

1. All stratified, and many, if not all, unstratified rocks are largely composed of materials derived from the destruction of pre-existing rocks.

2. The destruction of these pre-existing rocks has taken place in various ways. Thus, for example, rocks have been (*a*) worn away and re-deposited, (*b*) melted up and re-solidified, or (*c*) dissolved and re-precipitated. Thus rocks such as sandstone and clay, usually termed *aqueous*, are examples of *a*; those termed *igneous*, such as lava and granite, are examples of *b*; while the chemically and organically-formed rocks, such as travertin and coral limestone, are examples of *c*. Mica-schist, gneiss, and similar rocks have probably been formed by combinations of two or more of these methods of origin.

3. Rock-masses once formed are subject to continual alteration in structure, texture, and composition. Such alterations are effected by mechanical agencies, such as contraction, expansion, pressure, and strain; by chemical agencies, such as solution and chemical affinity; by physical agencies, such as heat and electricity; and by molecular agencies, such as crystallization and the like. Given these agencies, working together or separately, with sufficient intensity and with sufficient time for their action, and there is no limit to the amount of change that may be effected.

4. All rocks are more or less permeable to water and other solutions, not only through their joints but also through their substance.

5. All rocks and mineral substances are more or less soluble in pure water, and still more so in waters containing carbonic acid or other active chemical substances in solution; such waters, in fact, as are found to circulate in subterranean channels and fissures.

6. Although those modifications of force known as crystallization and chemical affinity act most readily in fluid masses, yet they are able to act also in solids.

7. All rocks, however solid they may appear, possess more or less plasticity when subjected to long-continued pressures. as may be very clearly seen in contorted sections of strata, and also in the distortion of fossils found in shale and slate.

8. From the surface of the earth (or from points very near the surface) downwards, there is everywhere a considerable and progressive increase of temperature.

9. So far as our knowledge of the interior of the earth goes, there is always present a large proportion of water in various forms.

Genesis of Ore-deposits. In studying this part of our subject, after defining and fixing the sense in which the term ore is used, we have to consider the nature of the containing or "country" rock, the manner in which a locus for the deposit has been prepared, and finally, the way in which that locus has become filled with ore-matter.

By the term *ores* we understand either native metals while still associated with their matrix or containing rock, or else such chemical compounds of metals proper as are usually worked for commercial ends.

Some ore-deposits are, quite obviously, of the same age, or approximately so at least, as their containing rocks; thus, a bed of iron ore of aqueous origin lying between two beds of sandstone would be somewhat newer than the lower bed, and somewhat older than the upper. But the great majority of ore-deposits are of much later origin than their containing rocks. We might therefore consider ore-deposits under the following heads, viz: (a) Contemporaneous deposits, comprising chiefly true ore-beds; (b) Secondary deposits, impregnations, segregations, &c., in rock-masses, veins, lodes and irregular deposits; (c) Detrital deposits, or natural mechanical concentrations.

Of course these classes overlap to some extent; thus a true bed may be altered by later segregations or withdrawal of material, while even detrital deposits are often modified by

subsequent infiltrations. Still, for practical purposes, the above classification will be found very useful, and probably at least as accurate as any other that could be devised.

Scope of the present work. As what may be called contemporaneous mineral deposits are somewhat rare and of little relative importance in the West of England, and as even these which do occur appear to have been subject to such an amount of change since their first formation as to bring them fairly within the scope of the third chapter of this essay, we need not consider them further in sketching out the divisions of its subject, which will be treated in five chapters, as follows:—

CHAP. I.—Formation of structural planes in rock-masses.

CHAP. II.—The mechanical phenomena of faulting.

CHAP. III.—Rock-change as affecting the formation of ore-deposits.

CHAP. IV.—The formation and natural concentration of detrital deposits.

CHAP. V.—The relative ages of the ore-deposits of the West of England.

In considering these various branches of the subject, we shall begin with the rock-masses as already formed, or, at least, in the first stage of their consolidation; any detailed discussion of the modes in which their materials have been accumulated not falling within our plan.

CHAP. I.—FORMATION OF STRUCTURAL PLANES.

Structural planes in rock-masses are formed in drying, in the process of solidification, as the result of molecular changes, by mechanical means, &c., &c. They are either *actual*, comprising the various “joint-structures,” due mainly to shrinkage or strain, or *potential*, comprising lamination, slaty-cleavage, quarry cleavage, and foliation, due partly to strain and partly to molecular movements within the mass.

Sec. 1.—Joint structure. In almost all rock-masses, whether aqueous, igneous, or metamorphic, divisional planes or joints abound. These are of two classes, the first including main or

"master" joints, "backs" and "beds," which continue uninterrupted for considerable distances, while the second includes such "joints," "heads," or "cutters" as are much more limited in their range. The master joints pass indiscriminately through the whole series, while the beds* separate the various strata. The secondary joints, on the contrary, are confined to each separate stratum. Sometimes, indeed, they do not pass quite through a block, in which case they are known to quarrymen as "shakes."

Both master joints and secondary joints are sometimes curved, though usually approximately plane.

Near the surface, in a cliff or quarry, the joints are usually more or less open, and often discoloured by chemical and other changes, so that they become prominent features. At greater depths the joints are much closer and altogether less conspicuous, yet they are really present and may soon be discovered if the rocks be brought to the surface and exposed to atmospheric influences for a short time.

The main joints, known as "beds" in aqueous or metamorphic rocks, are directly traceable to the want of continuity arising from differences of composition, or from interruptions in the process of deposition; while the so-called beds in granite and other eruptive rocks are more probably due to zonal cooling and consolidation. Other main joints in all classes of rocks seem to have their directions determined by the directions of the axes of elevation, these elevations being due, as already suggested, to the existence of pressures transverse to their directions. But, when the pressure is removed by a local subsidence and replaced by a strain, or when it is relaxed owing to shrinkage of the mass, we may expect a series of cracks to be formed. A little consideration will shew that these must usually run parallel to the elevations and approximately at right angles to the beds.

But contraction is all this while going on throughout the mass, and when the time has come for the formation of another

*The term "bed" has three common meanings. Thus it is (1) the stratum or layer of rock itself, (2) the main joint between two such, and (3) that surface of a block which is parallel to the stratification. It is generally easy to determine from the context in which sense the word is used.

set of cracks, they will be more likely to occur at right angles to the first, or nearly so, than in other directions, that is, in directions as different as possible from those of the first series, these different strains not having been at all relieved so far. Here then are three sets of main divisional planes, dividing the mass under favourable circumstances into approximately rectangular portions. The subsequent cooling and shrinkage of these will give rise to secondary fissures, which are likely to be much less regular and of much smaller extension in most cases. Their directions and positions will be especially modified or determined by such cleavage planes as have been produced in the meantime, or by the definitely oriented cleavage planes of constituent minerals, when these are present.

If the jointing is due to the causes suggested above, it is evident that the most favourable conditions for their production with regularity will be homogeneity of the rock-substances, comparative horizontality of the masses to be acted upon, and continuity. The first condition depends entirely upon the mode of origin of the rocks; the second is, with few and unimportant exceptions, at one period, at least, common to all stratified and many eruptive rocks; while the third is common to all rocks, without exception, until the dividing and disturbing causes have commenced to act.

Evidently, therefore, the first elevation of a rock-mass would give rise to its more important and best developed main joints. Any subsequent elevation might indeed produce joints, but their directions could not fail to be modified more or less by the effects of the first upheaval. This fact is the basis of the scheme of "Mountain Systems" of Elie de Beaumont, which has been applied to mineral veins by his pupil and successor Léon Moissenet. In all cases we find, as was by them first pointed out, that one of the main systems of approximately vertical fissures coincides in direction with some well-developed system of upheaval in the region under consideration. This may be called the longitudinal system, and it is generally crossed in a direction nearly or quite at right angles by the second or transverse system, the two systems being approximately, if not identically, of the same age.

Columnar jointing. The gradual conversion of fine mud into more or less hardened shale, which can be observed in any dried-up pond, is the simplest example of the production of jointing. By this drying, not only is the mud hardened, but joint-structures, somewhat similar to the columnar structures so characteristic of basalt, are often produced. At the same time a kind of lamination is developed, which is due to the existence of minute differences in the sediments not observable while the mass was still soft and wet. The mud, as it falls to the bottom, forms at first an apparently homogeneous mass; but as soon as it begins to dry, especially if there is any considerable thickness of it, slightly differing, and separable layers begin to be evident.

We may sometimes see these induration structures very well developed in the clay filling the old-fashioned shallow "clay-pans" of the china clay works. The short columns produced by natural drying are very different in size, and the polygons are very irregular, the number of sides varying from 3 up to 7 or 8, 5 or 6 being the most common number. The lamination is rarely very distinct, unless the clay has been "badly washed"—imperfectly freed from mica,—but in such cases it becomes very evident when the clay is thoroughly dry, although not visible while it is moist. It is surprising how hard some of these clays become when the drying happens to be very slow.*

Columnar jointing, produced by solidification from a state of fusion, has its best development in basalt, where it is evidently due to contraction and condensation around certain centres during solidification, as appears from the well-known experiments of Gregory, Watt, and others.

A similar jointing, due to the action of heat not sufficient to produce fusion, was produced in the experiments of Professor Chandler Roberts-Austen. Having heated a mixture of clay and sand very strongly (1020° C), and allowed it to cool slowly, he found it contracted 6 per cent., having also assumed a well-

*Many of the substances found in Cornish mines are quite soft when first met with, but harden considerably on exposure; as for instance Pitticite, the beautiful banded lithomarge found in the mines of Redruth, Illogan, and Camborne, and the semi-opal of St. Just. This is also said to be the case with Chalcedony in many localities. In some cases this hardening may be due to simple evaporation, in others it probably indicates a molecular change in the mass.

developed columnar structure.* A similar structure, accompanied by partial coking, is often produced in coal-beds which are traversed by whin-stone dykes, as may be seen in many parts of Northumberland. Specimens of this kind of change are exhibited in the Museum of the Royal Geological Society of Cornwall, at Penzance.

An example of columnar jointing produced by the action of some little-known crystallizing force is the following:—

“In the gypsum quarries of Chaumont, Montmartre, two beds of crystalline granular gypsum, each 6 or 8 feet thick, occur interstratified with fresh-water marls and limestones, each being effected by a prismatic jointing which does not appear in the clay. The prisms are mostly pretty regularly triangular and hexagonal, and seem to have been produced by the intersection of three sets of vertical equidistant planes crossing each other at angles of 60° .”†

A somewhat similar phenomenon is often observable in the crystallization superinduced in stalactitic masses of carbonate of lime. These at first are usually quite devoid of crystalline structure, but after a time are found to be traversed by planes of cleavage, exactly agreeing with the cleavage-planes of ordinary calcite.

Joint-structures in eruptive rocks. The remarkably well-developed joint-structure of the granites of the West of England is a matter of general observation. Almost every headland in the St. Just district affords notable examples of prismatic or cuboidal jointing, while tabular masses, which by weathering have been converted into tors of most fantastic appearance, occur on most of the highest hills.* The nature of the jointing in a granite quarry is of the very highest importance to the quarryman. If the joints are too near each other the stone is for most purposes valueless; if too far apart the labour of working is correspondingly increased; if they run obliquely much labour is necessary to prepare the stone for ordinary uses. With horizontal “beds,” vertical “backs,” (joints running right and left and facing the quarryman), not too far apart, and conveniently

*See Rutley, *Study of Rocks*, p. 258, note.

†Jukes and Geikie, *Manual of Geology*, 2nd ed., p. 181.

situated "cutters" or "ends," (vertical joints running at right angles to the backs), the granite quarryman is in his element. Many of the granite quarries of the West of England are especially notable for the large rectangularly jointed masses which they furnish. Each of the more important quarries affords examples of natural bed-joints, approximately plane surfaces, extending over many square yards, and when, as is often the case, the great masses so separated into beds are not broken up by too numerous end-joints, the material is enormously increased in value. It would be easy to supply, from the more important quarries, monoliths from 12 to 20 feet long and 3 or 4 feet wide and thick. Fine examples of such regular jointing may be seen in several of the granite quarries in the parish of Mabe and Constantine, near Helston; in the Carn Grey quarry, near St. Austell; and, indeed, in most of the larger granite quarries of the West of England.

We may be sure that the frequent occurrence of such masses on the tops and sides of the hills has greatly encouraged and facilitated the monumental efforts of the early inhabitants in the erection of the numerous menhirs, circles, and cromlechs which characterize the granite districts of the west.†

In elvans (felspar-porphyrries and felsites) the joints are generally more numerous and more irregular than in granite. Many elvans are divided by jointing into small angular masses throughout, while others, as in the case of the fine-grained felsite at Foxhole in St. Stephens, are full of curved joints. Really good blocks of building stone, derived from elvan, are comparatively rare, yet the elvans at Seveock, Newham, and Pentewan, and many others are capable of yielding fine and large blocks of very solid stone, and many gate-posts hewn from the Seveock Elvan, as much as 10 or 12 feet long without a visible flaw may be seen in the neighbourhood of Truro and Chacewater.

Joints in stratified rocks. In slates the joints are sometimes far from numerous, and when the slate is fine-grained and hard, and has a good cleavage, as at Tintagel, it becomes very valuable.

*See Carne, Trans. Roy. Geol. Soc. Corn., III, p. 209.

†This natural jointing, although often related to the "quarry-cleavage" referred to below is yet quite distinct in character and origin from that cleavage.

Sometimes however, slate, otherwise good, is traversed by millions of almost invisible joints, dividing it into prisms or lozenges of less than a square inch area. Of course such slate is absolutely valueless, but it is in precisely such circumstances that the jointing becomes the most remarkable for its regularity. In one of the quarries near Tintagel the writer found millions of fragments of slate in the form of slender four-sided prisms (pencil-slate). Each surface was smooth and flat, and the utmost variation of the corresponding angles of inclination, as measured by a contact goniometer, was less than 2 degrees. Some of the needles were two inches long and less than an eighth of an inch thick. Similar phenomena may be observed in shales of all kinds in hundreds of localities around our coasts.

Even columnar jointing, so characteristic of basalt and so noticeable in the granite cliffs near the Land's End, is not absolutely unknown in metamorphic and stratified rocks. Some thick-bedded sandstones are pretty regularly divided into columns, as might have been seen a few years since (perhaps may now be seen) in the coarse sandstones near Bissick in Ladock parish. A similar structure has also been noticed in the Devonian limestones of Plymouth and Newton Abbot, but only very locally.

However the joints have been produced, it is quite certain that the rending force has often been very considerable, since we find in conglomerates pebbles of hard quartz or hornblende rock torn across. This is common in the Ladock sandstones, and also in the conglomerates on the south side of the Helford River. By the use of the microscope, this rending of particles in the neighbourhood of joints is almost always to be detected, unless the rocks are composed of *very* fine material, or unless disintegration from chemical action is evident.

Sec. 2.—Lamination and cleavage. These structures, so far as they relate to rock-masses, may be generally defined as a *tendency* to split more readily in certain directions than in others. They may be traced to four causes, as under :—

(1). The original laminar arrangement of the materials of which the rock is composed. This is commonly called *lamination*, and it is rarely found except in sedimentary rocks. The lamin-

ation is generally parallel to the bedding, and when this is not the case it indicates what is known as "false-bedding." This form of cleavage-structure may, of course, become more evident by subsequent change. Ordinary *shale* (soft killas) is a good example of a truly laminated rock.

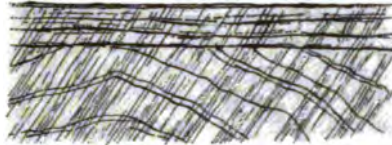
(2). A laminar arrangement of dissimilar mineral constituents, mostly crystalline and more or less inter-penetrating, is called *foliation*. It no doubt indicates an original lamination of some kind in most cases, if not invariably, but as it commonly results from subsequent changes, both of structure and composition, it will be more fully referred to hereafter. *Mica-schist* is a good example of a foliated rock.

(3). When a rock consists in any large degree of crystalline components, having marked and distinct cleavages, an arrangement of those components in such a way as to make the principal cleavages coincide in direction, must necessarily give rise to a distinct cleavage-structure in the whole mass. Thus, in fig. 1, Plate IX, which roughly represents a block of granite, if the crystals of felspar occur irregularly, as shown in the lower part of the figure, the rock will not be cleavable: but if as in the upper part, it will be readily cleavable. This may be called *quarry cleavage*; it is common in many rocks beside granite. Such a structure is often original, but there is reason to believe that it may also be induced in some cases. As these cleavages do not affect the soundness of the block, the quarryman working in the granite quarries of the West of England, where such quarry-cleavage is common, is often enabled to cleave out "posts" 12 or 14 feet long, whose cross-section is less than 100 inches area.

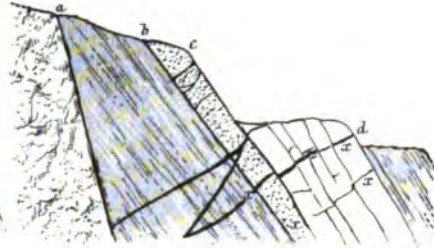
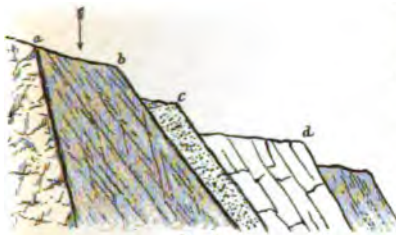
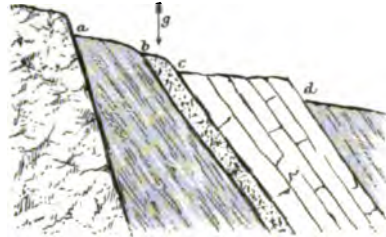
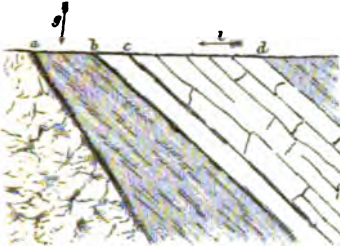
(4). Coincidence in direction of the particles of greatly unequal dimensions. This is best seen in roofing-slate, and it is known as *true slaty cleavage*. This structure is produced by pressure and "shear," and although the structure is usually independent of the three causes already mentioned, yet it is obvious that it may be aided by them.

How slaty cleavage is produced. Clay slate is essentially an altered mud; it differs from shale in being more highly indurated, in having a more perfect cleavage, and in that cleavage being independent of the bedding, this latter being usually either

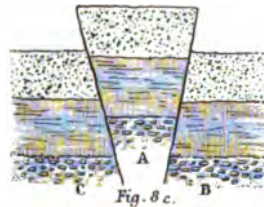
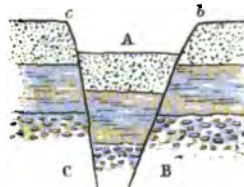
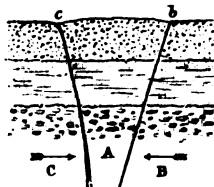
Quarry Clearance.

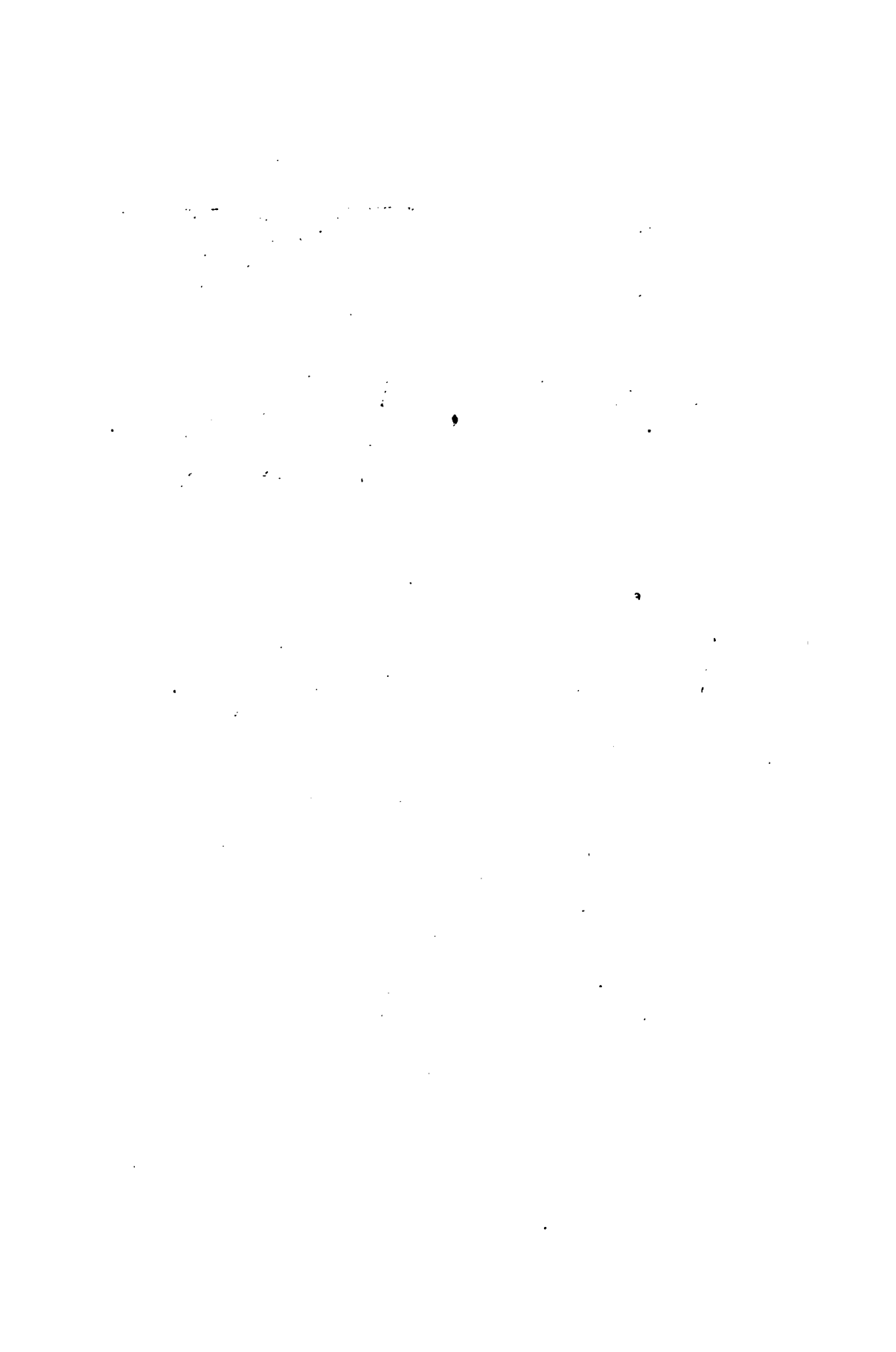


Hope's Nose.



Contorted and cleaved strata, Ilfracombe.





obliterated or only shewing itself by the difference of colour known as the "stripe" or "riband." Although usually found among the Palaeozoic rocks, some pretty good slates used for roofing in the Alps are of Lower Eocene age.

The effect of pressure in producing a cleavage structure in fine-grained sediments, or in similar substances of even composition, may be illustrated by experimenting with clay mixed with fine scales of mica or of oxide of iron, as shewn by Mr. H. C. Sorby, Professor Tyndall, and others. It was found that the particles all being free to move in direction at right angles to the pressure, those which were scaly in form (unequiauxed particles) became arranged with their broader planes facing the pressure so as to produce a cleavable and laminated mass. When wax alone was used a similar result was obtained, (though it was not so evidently laminated to the sight), as if the particles of wax themselves had been unequiauxial.

Proceeding from such experiments Mr. Sorby found by the use of the microscope, that the minute particles of which clay-slate was composed were either lengthened in the direction of the cleavage planes, or else re-arranged so that their larger dimensions came to coincide with those planes.

Mr. Sorby examined many specimens of cleavable limestones from North and South Devon by means of the microscope. He found that the various organisms and patches of crystals had been "compressed and elongated," so as to be "not exactly in the plane either of stratification or cleavage, but in such a direction as is the resultant of their combined influence."*

All this goes to shew that pressure and cleavage are closely related. Now, as cleavage is usually exhibited in regions which have been much folded and contorted, *i.e.*, exposed to great lateral pressures, it was not unnatural to attribute the cleavage observed to the same cause. But Sedgwick had shewn before 1856,† that cleavage was due to the operation of some very extensive cause *after* the rocks had undergone great displacements. That this is really the case is proved by the existences of sections like fig. 2, Plate IX, representing the unconformable strata at

*Phil. Mag. January 1856, page 31.

†See Phillips's Report on Cleavage, Brit. Assoc. 1857.

Hope's Nose, in Devon, where *the same* cleavage runs uninterrupted through two sets of beds which are distinctly of different ages, the lower set being much contorted. Here it is plain that the lower beds had become consolidated, contorted, upheaved and denuded before the upper beds could be deposited, while these latter had also been consolidated *before* cleavage was set up. Prof. Sedgwick suggested that the cleavage might be due to some kind of crystallization on a large scale, but this is negatived by the microscopic observations of Sorby and others already quoted.

But the Rev. O. Fisher has called attention to the fact* that to produce cleavage the pressure must be in all cases accompanied by a sideways strain or "Shear." He concludes therefore that the internal movements of rock particles which result in slaty cleavage are due to those rocks having been elevated, and left after elevation in a position too lofty for equilibrium. The "shear" which follows, owing to the action of gravity when for any reason faulting cannot take place, produces slaty cleavage.

Mr. Fisher shews that the direction of shear need not be the same as that of the resultant cleavage; on the contrary it may differ from it as much as 45° , and diminishing from that as a maximum, the two directions may become nearly though never quite identical as the shear is increased.† He also shews that shear alone would be competent to produce cleavage but for the faulting that would then take place, pressure being necessary to prevent faulting.

This pressure also produces *condensation*, hence the general rule that, other things being equal, the more dense a slate the better its quality.

M. Ed. Janettaz has also investigated this subject experimentally, and the structure he calls *longrain*, *long*, and *fil* appears to be a kind of secondary potential cleavage, similar to and parallel with the *shear* just mentioned. In experimenting on the plastic clay of Issy near Paris, a quantity was placed in a box having an outlet at the side. When this clay was forced out by application of a pressure from above equal to 40 k. per

*Geol. Mag. 1885, p. 397, *et seq.*

†Ibid, p. 400.

square c. m (say 600 lbs. per square inch), the escaping mass was found to possess a schistosity perpendicular to the pressure, and *longrain* parallel to the direction of its escape. When the clay was free to escape in all directions, cleavage perpendicular to the pressure was produced, but not *longrain*.*

The origin of slaty cleavage may be better understood by reference to figs. 3 to 6, Plate IX, where the upheaved stratified rocks are supposed to be unsupported or insufficiently supported from below, and therefore in a state of unstable equilibrium.

Under such conditions, gravity acting in the direction of the arrow *g*., fig. 3, there will be a tendency for the stratified rocks to slide down the junction *a*., and also down the beds *b*., *c*., *d*. There will also be a tendency to "shear" the beds vertically in directions parallel to the arrow *g*., all these tendencies being resisted by the lateral pressures acting in the direction of the arrow *l*.

In fig. 4 the pressures are supposed to be relaxed sufficiently to allow of movements along all the junctions, until finally equilibrium is restored, while in fig. 5 the first stratified bed is supposed to be of such a nature as to yield in its particles to shear instead of sliding over the junction *a*. In such a case the rock would become cleavable in directions between those of the junction *a*., and the bed *b*., as indicated by the fine lines in the fig. In fig. 6 the case of rocks whose particles do not yield to "shear," and some of whose beds do not admit of a sliding motion over each other, is illustrated. In such there will be a tendency for master-joints to open at right angles to the bedding, taking the shortest course across the beds as shewn at *x x*. In his diagram fig. 4,† Mr. Fisher shows how the cleavage angles may be calculated under various specified conditions.

The distortions produced by the slaty cleavage have been already dealt with. These are especially noticeable in the specimens of *spirifera disjuncta* found so abundantly in the slates

*Ed. Jannettaz, *Clivages des Roches*, Bull. Soc. Geol. France, 1884. It is worthy of remark that M. Jannettaz was able to trace the existence of *longrain* by means of varying thermal conductivity even when it was not mechanically evident.

†loc. cit.

at South Petherwyn, and first described by Sharpe in 1846.* In these rocks, shells originally little more than one inch long, are found to be extended in the direction of the dip to four inches or more, and at other times compressed to half an inch or less. Similar phenomena are observable wherever fossils occur in cleaved rocks.† An interesting example of the effect of pressure in producing cleavage in fine-grained material, and crumpling in material of coarser grain in one and the same set of beds, at Ilfracombe, is given by Mr. H. C. Sorby. This is illustrated in fig. 7, Plate IX, taken from his paper.

The foregoing experiments, observations and reasonings all go to shew that the causes of slaty cleavage are altogether mechanical, and that crystallization properly so-called, has nothing to do with it. In fact Mr. Sorby concludes his paper (already cited) with the remark that "in place of crystallization producing slaty cleavage, it has a contrary tendency." He adds, "can I therefore hesitate to conclude that slaty cleavage is the result of mechanical and not of crystalline forces.‡

All this is true using the word "crystallization" in its ordinary technical and exact sense. Yet there may be a kind of crystallizing force acting on a large scale as suggested by Sedgwick, which is under certain circumstances competent to produce cleavage. Fifty years ago and more, §Mr. R. W. Fox found that well-marked lamination could be produced in the most thoroughly kneaded clays by the long-continued action of a weak electrical current, just such a current as might be expected to exist between one rock-mass and another of a different nature; the lamination being at right angles to the direction of the current. Such weak earth-currents have been proved to exist in many experiments by him and by other observers. The following is an abstract of the description of one of these experiments as given by Mr. R. W. Fox himself. || "In this most interesting experiment

*Quart. Journ. Geol. Soc., 111, 1846.

†See the Geology of the Rio-Tinto Mines, by J. H. Collins. Quart. Journ. Geol. Soc., 1885, p. 247, (note).

‡Phil. Mag. 1856, p. 37.

§Rep. Roy. Corn. Polytech. Soc., 1837, p. 68.

||Catalogue of the works of Robert Were Fox, F.R.S., by J. H. Collins, F.G.S., Truro, 1878.

an earthen vessel was divided into two water-tight compartments by means of a clay wall of partition. In one cell was placed a mass of copper pyrites, in the other a plate of zinc, and the two were connected by means of a copper wire. The cell in which the copper ore was placed was then filled with a solution of sulphate of zinc, and the other cell with acidulated water, while the clay itself had also been well worked up with acidulated water. After three or four months the clay had become dry, and exhibited a schistose structure parallel to its perpendicular sides, *i.e.*, at right angles to the course of the electric current. One principal line of division was observable near the middle, which seemed to divide the clay into two separate plates, existing in opposite electrical states. When sulphate of iron was used in the cell with the copper-ore, thin bands of oxide of iron were formed; if sulphate of copper then veins of oxide of copper, besides which specks of oxide of copper were isolated in different parts of the mass. Mr. Fox thought these experiments illustrated the origin of schists, as well as of mineral veins intersecting schists and other rocks."

The very common schistose structure of clay partings and veins, in lodes and in masses of granite or other rocks near the lodes (*sheeting*), may very well be due to some form of electrical action as suggested by Mr. Fox. There are many cases in which a mechanical cause would be well nigh impossible. The "schistose-porphry" and the "porphyritic schist" (altered shaly sandstone) of the Rio Tinto district may not improbably have a similar origin,* and perhaps the schistose structure of rocks in mineral districts generally. It may be observed that true slaty cleavage is very rare in mineral districts, at any rate in those of real value.

It is obvious from the foregoing that true slaty cleavage, although something quite different from and independent of lamination and foliation, may yet, in some instances, be almost indistinguishable from them. Thus, in the case of lamination, if the original layers of a fine sedimentary deposit happened to coincide with the direction in which natural forces were producing true slaty cleavage, as must be the case in some portions of a highly

*J. H. Collins, *Geology of the Rio Tinto Mines*, p. 351.

contorted district, it is obvious that the lamination would assist and not retard the production of the true cleavage. Again, if a mud containing numerous flakes of mica were to be converted into a slate, the flakes being forced to take up positions such that the basal planes were coincident with the cleavage, the tendency for the rock to split along those planes might be increased. A similar result would follow in the case of a foliated rock, where, if the induced cleavage tendency coincided with the cleavage planes of one set of minerals, there might be a very good cleavage produced, while if the directions were different the cleavage tendency would be obstructed or retarded.

In leaving this part of the subject, it may be observed that cleavage in all its forms differs from every form of jointing, in the fact that the rock is physically continuous. A rock may be minutely and regularly jointed, but there will be no special tendency to fracture observable parallel to the joints, while in the case of truly cleavable rocks the finer the particles of which the mass is composed the more practically unlimited is the cleavage. In the best instances, in fact, cleavage is only limited by the transverse weakness of the separated plates. Thus joints may be called *actual*, while lamination, foliation, quarry cleavage, and true slaty cleavage only give rise to *potential* divisional planes.

Besides jointing and cleavage there are other potential divisions produced in rocks, which are sometimes of geological and mineralogical importance. Thus, for instance, concretionary structure in its many modifications. Some of these will be more particularly alluded to in a future chapter.

Geological importance of jointing. From a geological point of view the importance of jointing is very great. A rock having few joints, and those lying horizontally or dipping "into the hill," is almost indestructible by natural agencies; whereas, if the joints are numerous, and especially if they are highly inclined, the rain can freely enter, frost has great power to act, and rapid denudation takes place. This is especially noteworthy in the case of limestones. So long as there are few joints the rock remains almost unchanged. True it is slowly dissolved if water falls upon it, and if moving water holding in suspension sand is

able to flow over it, the rock is somewhat abraded. But if there be many joints, rain, frost, vegetation, gravity all get to work, and the destruction is often very rapid. The origin of deep ravines, vertical escarpments, and caverns, so common in limestone centres, can be readily traced to the nature of the prevalent jointing. It is probably not too much to say that the minor features of surface sculpturing on the earth's surface have been more determined by the nature of the jointing than by all other causes taken together, at any rate, in countries where rain and frost are working agents.

CHAP. II.—THE MECHANICAL PHENOMENA OF FAULTING.

Conversion of structural planes into fissures. We have seen that joints are, for the most part, produced by shrinkage or strain. So long, therefore, as the rocks are subject to great pressure the divisions will either not exist or they will be very fine and close, unless there has been previous displacement by violent earth-movements.* We have seen, too, that slaty cleavage is a limited phenomenon. It can only be produced in fine-grained rocks, for the most part, even when the necessary pressure and "shear" action is present. Lamination is also a somewhat local character of rocks.

We have then to consider the case of rocks, already traversed by divisional planes, either actual or potential, some being either parallel in direction with a not far distant axis of elevation, or at right angles to such an axis. Should now the shrinkage still continue, or should the upheaval of the anticline or the subsidence of the syncline be renewed, the lateral pressure being in either case relieved, some of the longitudinal divisional planes will be opened up into distinct fissures, since they are already, by hypothesis, planes of weakness. Hence it is that the lodes in a district frequently coincide in direction with the main joints. These forces thus act separately or together, to open the fissures more and more; and the tendency will be to concentrate the action in a comparatively few well-

*At great depths it is probable that there are no joints, since the rocks in such situations must be under great pressure, and must possess a considerable amount of plasticity. Yet at still greater depths there may be rare but extensive fissures gaping downwards.

situated fissures rather than to spread it equally over the whole number of divisional planes. This must be so, in fact, because the fissures are altogether *actual* divisional planes, while the unfissured cleavages and laminations are only *potential*.

Conversion of fissures into faults. Fissures being once formed in a rock-mass, successive pressures or shrinkages will be likely to produce movements in the planes of fissuring and consequent faulting. Ordinarily their movements will be slow, gradual, probably imperceptible, except after the lapse of considerable periods of time. When they occur suddenly there must be earthquakes of greater or less severity, although it does not follow that a great earthquake implies a great fault or *vice versa*.

Lode-fissures are often spoken of as *results* of earthquake action. It is likely enough that some fissures have been thus formed, but in general it seems much more likely that they have been formed by successive shrinkage and consequent faulting of the rocks, as described above, so *causing* earthquakes.

The fact that many mining districts are remarkably free from earthquake shocks has sometimes been urged against the view that faults indicate earth movements. But, in truth, they only indicate that such movements have taken place in former times. In many instances the numerous fractures have been so solidly repaired as to render a fractured region one of the specially strong parts of the earth's crust.

We shall see hereafter why the rupture of rocks of particular texture favours the production of cavities suitable to serve as ore-deposits, while others are, in this respect, unfavourable.

M. Leon Moissenet has illustrated, in a generalized way, and apart from the concurrent effects of denudation, the mechanical results likely to be produced in a region where stratified rocks rest upon the flanks of a mass of granite, at a moderate angle, the district being subjected to a series of movements of upheaval, followed by partial subsidence.* The system of upheaval is supposed to be east and west, and the granite to the south is slowly elevated, the slate resting on its northern flank being elevated with it, but not to the same extent. If we suppose the elevatory force to be localized southward, the

*See Moissenet, Lodes of Cornwall, 1837, p. 35, and plate III, figs. 1 and 1a.

effect of gravity on the northward lying rocks will be to open the suitably situated joints or fissures, so producing one series of fissures (Fa) dipping away from the granite, and another series (Fc), parallel in course, but dipping in an opposite direction, *i.e.* towards the main mass of granite.

The first series will be almost certainly faulted by "descent of the hanging wall," the second may or may not be faulted at this stage.*

Whenever a re-action sets in, and the elevated region begins again to subside, there will be a re-opening of the same main fissures in preference to the formation of new ones, the somewhat faulted northern fissures (Fa) will probably remain faulted, while the little faulted southern ones (Fc) will now be liable to considerable faulting. At the same time new subsidiary fissures are likely to be opened, so subdividing the prisms in the manner indicated in the two diagrams to which the reader is referred.

The strains occasioned by these various movements will be mainly in directions parallel to the axes of elevation, but the whole rock mass must necessarily be in a state of strain, and the strains remaining after the longitudinal faultings will be best relieved by the production of a second set, as different in direction to the first as possible, *i.e.* at right angles. These will form the "perpendiculars" to the longitudinal systems. There may still be two sets dipping in opposite directions, as in the case of the longitudinal systems, but the dip on the whole is likely to be greater (more nearly vertical) than in the case of those fissures.

Mountain Systems. As the "systems of elevation" with their corresponding depressions and longitudinal fissures follow approximately straight lines, we may regard them as portions of great circles; all folds, fissures, &c., which are parallel to each other,† being regarded as belonging to the same "mountain system."

*If there should be no suitably situated planes of weakness (divisional planes actual or potential) the tendency will be still to rupture the rocks in these directions.

†Parallel, that is as meridians are parallel.

The "mountain system" theories of M. Elie de Beaumont* are twofold. The first portion treats of the relative ages of mountain chains, and to their grouping into contemporary and parallel "elements." The second correlates the observed directions of the different systems according to an assumed geometric law, by means of a "pentagonal network." We can accept the first portion without of necessity adopting the second.

M. Elie de Beaumont, in 1869, after correlating the recorded observations of geologists in all parts of the world, announced that he had been able to define 85 distinct mountain systems, which included most of the principal bands of contortion and axes of upheaval on the earth's surface. He referred each system to some properly defined great circle, all the parallel contortions within 10° on either side being regarded as belonging to the system. He observes that any particular mountain-chain may belong to one system, or may be made up of "links" belonging to two or more systems of different dates. The relative ages of these systems can be determined by observing the ages of the stratified rocks which are respectively elevated and undisturbed on their flanks.

M. Leon Moissenet finds that eleven of the more ancient of Beaumont's systems of fracture are represented in various parts of Cornwall and West Devon, six running east and west, and five north and south. Connected with these eleven "systems," he detects 132 distinct bearings of lode-fissures, as under:—

a.	The eleven systems	11	bearings.
b.	Their perpendiculars	11	„
c.	The bisectrices of the acute angles formed by pairs of adjoining systems†	55	„
d.	The perpendiculars of these bisec- trices	55	„
Total		132	

**Notice sur les systèmes de Montagnes*, Paris, 1852. See also *Observations on the Lodes of Cornwall*, by M. Leon Moissenet, translated by J. H. Collins, Truro, 1877.

†The groups c and d require a word of explanation. Lode fissures are rarely straight, those which are best developed seem to be made up of distinct "systems

The following are the eleven systems referred to, the directions being given to the nearest whole degree, after calculating the small allowances to be made on account of the convergence of meridians.

<i>E. & W. Systems.</i>	<i>Directions.</i>	<i>N. & S. Systems.</i>	<i>Directions.</i>
Finistère	22° S. of W.	Vendée	26° W. of N.
Westmoreland	40° S. of W.	Forez	23° W. of N.
Land's End	8° S. of W.	N. of England	8° W. of N.
Pays Bas	15° S. of W.		
Morbihan	36° N. of W.	Longmynd	20° E. of N.
Ballons	5° N. of W.	Rhine	10° E. of N.

These angles when protracted form 4 natural groups, viz: the E.W. lodes, the N.S. lodes, the N.E. caunters, and the N.W. caunters. Nearly all the East and West lodes, and all the really good ones in the West of England, are included in the first group; nearly all the North and South lodes in the second group; while most of the caunters come very near, if not absolutely within the third and fourth groups. Moissenet remarks that, of the eleven systems, the first four, viz: Finistère, Westmoreland, Land's End, and Pays Bas, correspond with the East and West lodes in all mining districts of the West of England, the Morbihan system is well-developed in St. Just, and both it and Ballons in the Liskeard and St. Austell districts, while the combined effect of these latter is evident in the "caunters" of Camborne and Illogan.

"The very ancient systems of Vendée and the Forez make a very small angle with each other, and are very nearly perpendicular to the system of Finistère, whilst that of the N. of England is almost exactly perpendicular to the Land's End system."*

of fracture." It is obvious that the mean bearing of such a lode, which is usually all that a miner records, will not be that of either of the components, but approximately intermediate between the two. Furthermore, it may often happen that a new fracture will take place between two bearings neither of which is exactly in the direction of the strain—both being about equally removed from the said direction. The same remarks apply to the group *d*.

**Loc. cit.*, p. 86.

Conditions necessary to faulting. From what has gone before it will be evident that, in the great majority of cases, if not in all, faulting is to be regarded as resulting from the action of gravity on an insufficiently supported rock-mass. Plainly, then, there can be no faulting (*a*) while the mass is still plastic, or (*b*) while the acting force is less than the cohesion of the material or the friction on its divisional planes. With the case of rock-substance still plastic, in the ordinary sense of the word, we have no more to do, but it is evident that the existence of bed-joints and master-joints must facilitate faulting, since they destroy the strong cohesion between the particles.

Faults, then, are due, directly or indirectly, to the force of gravity. Yet Mr. Wilson very truly says "Faults are the inevitable result of the *elevation* of a curved surface."* There is no contradiction here, since elevation and depression are only relative terms, and we have seen that depression produces elevation. The opposition, therefore, so far as there is any, is one of time rather than of agency, and we may say that *depression occasions contortion and elevation, and is followed by faulting*. On already fractured rocks we have seen that faulting may result from the direct action of gravity, when the gravitating force of an insufficiently supported mass overcomes the support afforded by lateral pressure (itself an effect of gravity), and the friction of the divided surfaces. On unfractured rocks faulting may result when the action of gravity is so great as to overcome the cohesive force of the rock-matter in its weakest part.

Faulting may also result from the pressure due to the gravitation of a large mass exceeding that of a smaller one, plus the resistance due to the friction of the adjacent surfaces. Thus, in fig. 8*a*, Plate IX, if the mass A be very great, and the lateral pressures acting in the direction of the arrows, as well as the friction of the surfaces *b*, *c*, be small, faulting will take place, and the result will be as in fig. 8*b*. But if the pressures in the direction of the arrows be very great, the friction on the surfaces *b*, *c*, small, and the weight of the mass A also small, it may be forced up, as in the position fig. 8*c*. It is obvious that faulting by *descent* of the hanging walls, as in the former instance, will,

**Op. cit.*

in a shrinking globe, be much more common than by its *ascent*, as in the latter, *i.e.* faults resulting from the *direct* action of gravity (direct faults) will be more common than those due to pressure consequent on gravity (reversed faults).

In the case of a fissure which is vertical, we cannot, of course, speak of either hanging-wall or foot-wall; very rarely, however, is this the case. In general the fissures are more or less inclined, and the descent of the hanging-wall side goes on until the resistance met with, from friction or wedging, is equal to the force which gravitates the mass towards the centre of the earth.

Recognition of faulting. This, although sometimes plain enough, is not always an easy matter. Obviously, fault effects are most evident in districts where the several beds vary much in colour and texture, as, for instance, in the Coal Measures; here the displacements are so evident that probably no one has ever suggested that the broken portions of the beds were not at one time continuous. The case is very different in the West of England. The comparatively little variation in character of the contiguous beds of killas in the mining districts of the West of England has veiled, in many instances, notable faulting. Speaking of the difficulty of detecting faults in such a country, Delabeche says "Their very abundance renders them difficult to trace with accuracy, as it is only when dissimilar rocks are brought into contact that this can be satisfactorily accomplished," and again, "similar slates of the granitic series being alone brought into vertical contact with each other, it cannot be satisfactorily traced."*

There are, indeed, many plain indications of faulting arising from the intersections of lodes, as will be seen hereafter, but the practical miner, who too often looks upon all the surroundings of a lode as its consequences rather than its cause, has frequently and, indeed, usually misinterpreted such phenomena.

Direction of movement. The terms "downthrow" and "upthrow" are, of course, relative to each other, and they are not much used except in "bed" or "flat" mining, yet they express a truth which is often lost sight of in vein-mining, *viz.*,

* Report, &c., pp. 293-5.

that portions of the earth's crust have actually descended towards its centre. The general idea among practical men in the West of England, at anyrate among the comparatively few who believe in rock-movements at all, is that the lodes are "heaved" horizontally so many fathoms to the right or left, as the case may be. This, of course, is true in a sense; obviously, the descent of the hanging-wall of an inclined fissure involves both vertical and horizontal transference, and includes more or less of these components respectively, according to the amount of inclination. A great many illustrations of such heaves are given in works on Physical Geology. A few examples will suffice in this place. Fig. 9*a*, Plate X, represents a cross-section of a portion of country-rock traversed by a lode-fissure *cc*, and subsequently fractured as at *dd*. If now the fissure *d* becomes faulted by the descent of the hanging-wall, as in fig. 9*b*, the lode *cc* will be faulted as shewn. Plainly this may be spoken of as a downthrow of the portion E or an upthrow of the portion F, but all experience shews, when the matter can be brought to the test in other ways, that it is really a descent of the part E, in the immense majority of cases. If, indeed, the descent were sudden and abrupt, so that we could see the upper portion of F standing, like a cliff, above the surface of E, few would doubt the subsidence of E, none could doubt the actual motion of the rock-mass; but generally we only see such faults long after their origin, when the ground has been worn away at the surface, as shewn by the dotted line *xx* in the same figure.

In some cases the same fault, in heaving two lodes, throws one to the right and the other to the left, as in the well-known example at East Pool Mine, illustrated in fig. 10, in the same plate, where *aa* *bb* represent cross-sections of two lodes dipping in different directions. If now these be traversed by a cross-lode, suppose in the plane of the paper, and if the front portion be supposed faulted down to *gg*, as indicated by the dotted lines, then *cc* will be a left hand heave, and *dd* a right hand heave to anyone approaching from behind along *a* or *b* respectively.

Drag of faults. The movement of extensive rock-masses must necessarily produce many minor flexures and contortions in the immediate neighbourhood of the fissure. Such phenomena are well known under the term "drag." They are naturally most

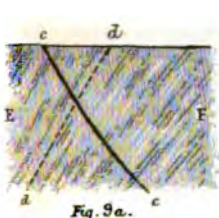


Fig. 9a.

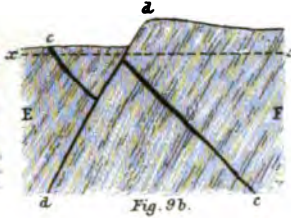


Fig. 9b.

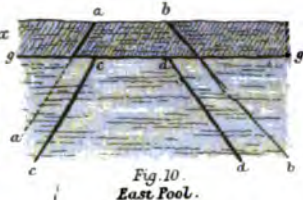


Fig. 10.
East Pool.

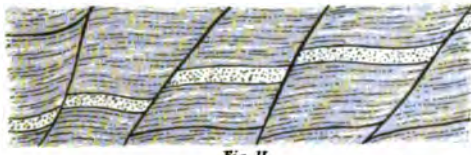


Fig. 11.
Drag of Faults.

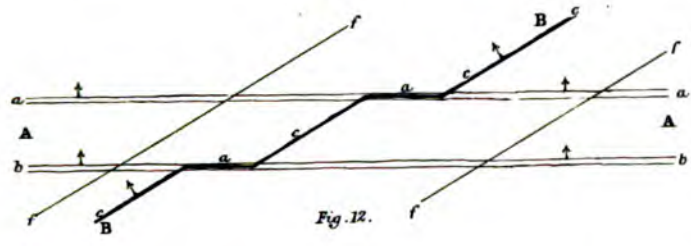


Fig. 12.

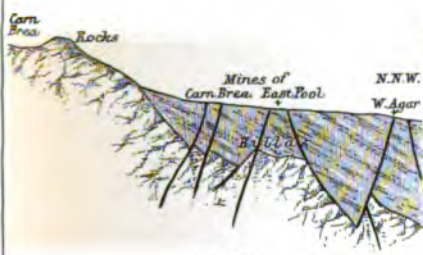


Fig. 14a.

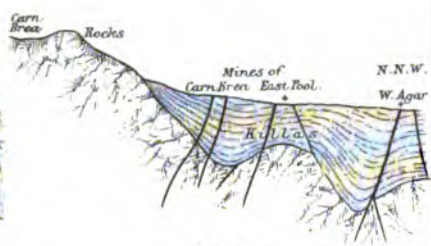


Fig. 14b.

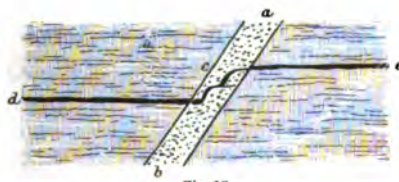


Fig. 13.

evident in regions where the rocks are of such a nature as to retain some notable degree of plasticity, but "drag" is rarely entirely absent, except in very solid and massive rocks.

In the lodes of Cornwall the "drag" is generally taken into account by the experienced miner who is in search of a lost lode, a species of instinctive perception guiding and influencing him, even when he professes not to believe in earth movements at all. A good illustration occurred some years since at East Carn Brea Mine, which is illustrated in fig. 11. A number of small elvan courses occur in one part, parallel, or nearly so, to the lamination of the killas, which is here traversed by many lodes parallel, or nearly so, in strike and dip. At some distance from the lodes the strata are more or less horizontal, but on approaching a lode they become considerably inclined, being tilted up on the hanging-wall side and bent down on the foot-wall. "The hanging side of the lode is always the lower, as if it had slipped down. The direction of the movement of strata is clearly proved, by the slickensides, to have been up and down, and the courses of elvan shew the extent of the dislocation."*

Slickensides and flucans. In the preceding paragraph reference has been made to slickensides as indicating an up and down motion in the fissure. The peculiar shining striations so-named are familiar to miners in all countries, and are rarely absent from true fissure lodes. That the rubbing has been continued for some considerable time is indicated by the polished character of the surfaces; even when very hard the scratches are sometimes very deep; they often succeed each other, as if the fissure had been partially filled up and the motion renewed; and they are frequently accompanied by considerable quantities of the adhesive clay, known to the miners as "flucan." This flucan is regarded as a good sign by most miners, especially for copper. So, indeed, it is, not because of any particular affinity between clay and metallic minerals—in fact flucan is as abundant or perhaps more so in the barren cross-courses as in the productive lodes—but simply because it indicates such a long-continued opening of the channels, through which the metallic solutions have made their way, as would give time for their deposition in

*S. Bawden, *Rep. Miner's Assoc. of Cornwall and Devon*, 1866, p. 30.

quantity. The existence of "sandcourses," as at Great Beam Mine* and East Wheal Rose, probably results from a similar grinding motion, the clay having been carried away by the waters to another part of the fissure.

Intersecting fissures. Assuming that one of the mechanical effects of the elevation of a "mountain system" is the production of two sets of vertical or inclined fissures, one parallel to the axis of elevation, the other at right angles to it, we have now to consider the probable effect of a second system of upheaval acting in or near the same region. Should the new axis actually coincide with the old one, or be at right angles to it, the tendency would be to re-open the old fissures, and perhaps to form some new ones parallel in bearing but with different underlie. Even if the new system should not be exactly parallel or at right angles to the old, if for example there should be a difference of 10° or so, many of the old fissures would still be re-opened in part. But in many cases also we should have new fissures formed in portions of the rock-mass which had before escaped fissuring. Thus, in fig. 12, Plate X, *a.a.* and *b.b.* being fissures of a primary system parallel to the axis *AA.*, and dipping in the direction of the arrow-heads, if a new axis of elevation *B.B.* were subsequently formed, we might expect the new fissures having similar dip to take the course of the black line *c.c.c.c.c.* But if the old fissures were already very strongly repaired, the new fissures would probably go directly in the course *f.f.*, and this would certainly be the case with new fissures dipping in the opposite direction. In proportion, too, as the angles between the new and the old system approached 45° in that same proportion would there be a tendency for entirely new fissures to form, while, if the angle became greater than 45° , the tendency would be to re-open the corresponding "perpendicular system."[†]

To a certain extent all new fissures must tend to the obscuration of old ones, especially when four or five "systems" are superposed, as must frequently happen in a geologically

* See *The Hensbarrow Granite District*, by J. H. Collins, Truro, 1878, p. 39.

[†]This subject of fissures made up of "elements" from various systems, producing "turns," "warps," or "inflexions," is fully dealt with in Moissanet's "*Lodes of Cornwall*," Chap. 1, Plates II and V.

ancient region ; yet, if we study the directions of the separate "elements" of the lodes rather than their mean directions, the fissures or parts belonging to each of the systems will generally be recognizable, and often with great distinctness.

That the fissures in any given region are really of various ages is evident, since we find some clearly traversing others. When the rocks are distinctly faulted this is still more evident, yet we cannot always say with certainty that the latest fault movement has taken place in the latest formed fissure. A study of lode fillings teaches us that many fissures have been re-opened again and again, and at widely different periods, and it is only by a close study of the conditions of these fillings that we are able to arrive in many cases at just conclusions hereon. This branch of the subject will be further dealt with hereafter.

Complex fissures. As then the movements of the ground in an already fractured district could hardly ever be confined to the production of new fissures, and as those old ones which became re-opened would only be re-opened in some portions of their course, it is easy to see that many complex fissures would be likely to be formed capable of greatly misleading the superficial observer. It will readily be understood that such complex fissures are most likely to be formed when the angles between the two systems are small. Thus the *Cudna Reeth Lode* at Botallack mine appears to be heaved 20 fathoms to the right by the *Wheal Hazard lode*, when the two are seen in plan, from which fact we might conclude that it is the older of the two. It appears, however, that the mineral deposit known as the *Cudna Reeth Lode*, may be traced continuously through that of the *Wheal Hazard Lode*, hence this at least is newer than the *Wheal Hazard Lode*. A careful consideration of all the facts observable leads to the following conclusions:—

1st.—The *Cudna Reeth fissure*, with probably part of its filling, was first formed.

2nd.—The *Wheal Hazard fissure* was then formed and subsequently filled, the *Cudna Reeth Lode* being heaved 20 fathoms.

3rd.—A complex fissure consisting of the two portions of the *Cudna Reeth Lode* with 20 fathoms of *Wheal Hazard Lode* was opened up.

4th.—This complex fissure became filled with mineral matter of a distinctive character, the whole of which is now known as the Cudna Reeth Lode.

No proper idea of the importance of faults from a geological point of view can be obtained, if we do not consider the enormous number existing in such a district as Cornwall and West Devon. Probably there is not a square mile in the whole of the mining regions which is not traversed by one or more faults, while in some places there are dozens within such an area. It must not of course be supposed that all are metalliferous, still less that all will pay for working. Still this fact has much to do with the long continuance of the West of England as a mining region, and should give us hope of new discoveries in the future as in the past. Very striking examples of the much fissured St. Agnes region are given in Mr. Davies's excellent little work on heaves and faults.*

Whatever may be the advantages of a greatly faulted country from a mining point of view, it is evident that the existence of divisional planes in the rock-masses will have contributed to the favourable results, in so far as they have favoured the formation of fissures serving as channels for the metalliferous solutions, or *loci* for the deposition of mineral substances. But it does not follow that a much jointed rock is better than one having comparatively few joints. On the contrary unless the fault movements are concentrated into a comparatively few fissures, it may be that the mineral filling will be too much distributed to be of commercial value. Such stockworks as those of Minear Downs, Mulberry Hill, and Wheal Jennings, can only be worked at a profit because they are at the surface, and workable as open quarries. The much richer underground stockwork at Pednandrea mine, described long since by Mr. H. C. Salmon, could not be made to pay, although if the mineral spread through 50 or 60-ft. had been concentrated in a lode of 5 or 6-ft. it would have paid remarkably well.†

In studying fault phenomena, it is necessary to be on one's guard as to certain phenomena which simulate faulting. Sir

* Report Miner's Association of Cornwall and Devon, 1879.

† See *The Mining and Smelting Magazine*, 1862, pp. 143-4.

Henry Delabeche in his "Report," already quoted, illustrates by diagrams how a lode may be apparently although not really heaved by an elvan course. Many such cases are known in the West of England, and it may be worth while to reproduce his figure and remarks thereon. "Let *a. b.* fig. 13, Plate X, represent an elvan, and *d. e.* a lode formed subsequently to it. Without due care and examination it might be assumed that the elvan *a. b.* was introduced into a fissure formed after the lode *d. e.*, heaving it at *c* In the same way a lode may be apparently heaved while passing from slate into granite, arising from the fact that the plane of junction is more easily divided for a short distance than the direct line of fracture followed."* Such apparent heaves very rarely occur in cases of intersection where the intersecting veins form large angles with each other, or where they have very different or opposite angles of underlie. Moreover in most cases of true heave, indications of what we have termed "drag" occur, which are wanting in the cases we now refer to, so that if a little care be taken there is not much likelihood of such apparent heaves being mistaken for true heaves when the actual intersection is visible.

As already mentioned, such complex fissures are most likely to be formed when the angles included by the intersections of the veins are small, as in the case just mentioned, but some at least are known where the intersecting veins form angles near to 90°. In such cases however, the heaves are rarely large. One such appears to have been worked on at South Spearn Mine, in the parish of St. Just. Here the Noon Reeth Guide seems to be carried by the Lane lode, but really passes alongside of it for a distance of 50 fathoms.† In all such cases as those given above, the apparently heaved lode seems to be actually the older, and to have been really heaved as regards the original fissuring, whether its mineral filling traverses the heaving lode or not, but the traversing *deposit* is undoubtedly the newer.

*Delabeche Report on Cornwall, Devon, &c., p. 299.

† With reference to this, Mr. Henwood remarks that "the lode contained neither tin nor copper while running in the direction of the guide. This of itself seems to shew that the 50 fathoms in question were really part of the complex fissure of the guide. It is not improbable that the corresponding portion of the lode is still standing unworked at some small distance to the northward.

On the other hand there is no doubt that very many of the smaller "apparent heaves" are nothing more than contemporaneous fractures, with a considerable shift among the various fragments.* Such movements may be particularly well traced in many stock-works, as for instance at Polberrow, in St. Agnes.

It is not the object of these papers to explain all the phenomena of faulting; enough has been said on this subject, if it be understood that in the West of England, as in all other mining localities, nearly the whole mechanical phenomena of the intersections may be clearly accounted for by considering the hanging-wall side to have descended, the rocks taking up more room laterally so to speak, so as to close up and occupy space left vacant by shrinkage and contortion. In a few instances, perhaps 3 per cent of the whole, reverse action has taken place, the rocks being faulted while under lateral compression so that the hanging wall has *ascended* in relation to the foot-wall. In very rare cases there are evidences of a descent of the hanging wall at one end of a fissure, and an ascent at the other, due to a movement of revolution in the mean plane of the fissure around some intermediate point.

Junction faults. The junction of granite and killas in the West of England often affords distinct evidence of faulting, and sometimes on a considerable scale. Near Ashburton, a lode is marked on the geological map which coincides for a considerable distance with the direction of the junction of granite and killas.

According to Mr. Henwood, many of the lodes of the Caradon district have granite on their foot walls, and slate on their hanging walls.†

Very similar phenomena have been observed in connexion with the "Great Flat Lode," which is pretty accurately coincident with the line of junction of the Carn Brea granite where it touches the slip of slate which lies to the southward

*Delabeche, Report, &c., p. 297.

† "It seems therefore that whether the lodes of this district dip N. or S., the shallower parts of their upper (hanging wall) side are of slate, whilst the immediately confronting portions of their lower (footwall) as well as both their sides (walls) at greater depth, are of granite." Henwood, *Trans. Geol. Soc. Corn.*, VIII, p. 660.

between it and Carn Menezes. The lode approximates more to a plane than the actual junction; consequently, for short distances it has sometimes both walls of slate, and at others both of granite. But it is evident that the position of the great lode has been in the main determined by the line of weakness due to this junction.*

It would appear that the "wave-like succession of granite ridges" observed in the mines to the north of Carn Brea, running parallel to that hill, are really produced by the subsidence of wedge-like prisms of ground occasioned largely by junction faults, and not to any original ridged surface possessed by the general granite mass. Fig. 14*b*, from H. C. Salmon,† illustrates what he supposed to be the form of the granite surface in the neighbourhood of Carn Brea, East Pool, and Wheal Agar Mines where overlain by killas, while fig. 14*a* is my interpretation of the self-same facts. In each case it must be borne in mind that there is necessarily speculation, since the junction of granite and killas is only visible at a few points, where the lodes and cross-cuts intersect it, the junction at all intermediate points being matter for inference. If my interpretation be correct, the supposed granitic ridges north of Carn Brea, are merely longitudinally faulted junctions of granite and killas.

These faulted junctions are more common than has been supposed, yet they are by no means universal, as is proved by the numerous instances where granite veins are seen to penetrate the stratified rocks without being cut off, as at St. Michael's Mount, Wicca Cove, and Tremearne.

Cumulative effects of faulting. It has been observed that the really great faults in the earth's crust, such as the Pennine fault in the North of England, rarely occur in regions which contain many small faults, that they are great in fact because the movements of a great length of time have been concentrated in them. In the West of England the amount of faulting at any particular point is rarely very great. With the exception perhaps of some of the junction faults which bound the granite bosses, and a few of those which are known as "great cross-courses," it seems

* See Foster, "on the great Flat Lode." *Quart. Jour. Geol. Soc.*, 1878.

† Mining and Smelting Magazine, Vol. 1, 1862.

probable that no single dislocation is accompanied by more than 100 fathoms of vertical displacement, while many only produce displacements of a few feet or even of a few inches. Nevertheless the absolute number of faults belonging to each group is usually so great that their cumulative effect is very considerable. Thus, between Portreath and Perranporth on the north coast, a distance of about nine miles, no fewer than thirteen considerable north and south faults (cross-courses) are known, besides many minor ones, nearly all of which have their down-throws to the eastward. Consequently, the geological horizon of the Portreath rocks is considerably below that of the rocks at Perranporth. One of these faults, the most easterly of the group, is known to occasion about 600-ft. of vertical displacement, and those which are seen at Porthtowan, Tobban Cove, and Gayack Cove are little less extensive. The total vertical displacement in the nine miles referred to cannot be less than one mile, and may be as much as two miles.

Going east towards Padstow, north and south faults with easterly down-throw are still frequently met with, and the total vertical displacement between Portreath and Padstow will be very moderately estimated at 15,000-ft., or say three miles.*

The faults known as cross-courses not only cross the principal mineral veins, but also for the most part cross the strike of the rocks; they are sometimes spoken of as "dip" faults, but better as "cross-courses," while those that run with the strike are called "strike" faults. This class includes most of the principal east and west lodes of the country, and as already remarked, it is not often that we are able to determine the absolute amount of downthrow in such faults, although it is probably as great in its totality as that of the cross-courses in equal spaces.

Surface indications of faults. That the surface sculpturing of a country depends greatly upon the varying character of its rocks is a geological truism. The effects of jointing have been already referred to with some amount of detail. I propose here to give a few further illustrations as regards faulting, drawn

* See the Author's Geol. age of Central and West Cornwall. *Journal Royal Institution of Cornwall*, VIII, 1, 1881.

from the West of England mining region. That a very large number of valleys in the West of England coincide in direction with faults which are not ore-bearing in any notable degree, is of course well-known, but there are also many which correspond to mineral veins. Thus, the Valley of the Teign coincides with and appears to have been occasioned by the lead lode which has been so extensively worked at Frank Mills, and the Lower Luxulyan Valley coincides with the course of the Treffry Iron Lode.

The Valley of the Exe coincides with a north and south fault for a considerable distance, as beds which ought to be continued across it in the line of strike are found to have been heaved out of their places. The boundary line between the carbonaceous series and the "grauwacke" of North Devon and Brushford, is heaved more than half-a-mile to the southward on the left bank of the Exe near Exe bridge, and the junction line of the red sandstone and carbonaceous series near Washfield, on the North of Tiverton, and also near the latter place, is thrown nearly half-a-mile to the southward on the east side of the river.*

In Ligger Bay several cross-courses may be seen in the cliffs. The largest of these which, is 3 or 4 fathoms wide, dips eastward some 60° or 70° ; the country on both sides consists of killas, but on the east it is of a pale greyish colour, while that on the west is deep blue. Among other valleys which appear to coincide with faults, may be mentioned the picturesque valley of the Fal, from Tregoss Moor to Terras Bridge, and the small valley which runs between Dolcoath and Cook's Kitchen, which latter coincides with what is known as the "great cross-course" of the Camborne and Illogan district. This is nearly perpendicular, nevertheless it heaves the lodes from 50 to 70 fathoms to the right. The coincidence in direction of the valleys, joint-systems, and lodes of the St. Just district has been adverted to by Mr. N. Whitley and Miss Elizabeth Carne, and the similarity of direction observed between ordinary joints and lodes has been remarked by Mr. Henwood;† the connexion has also been dwelt upon in the foregoing pages.

* Delabeche, Rep. on the Geol. of Cornwall, &c., p. 294.

† Trans. Roy. Geol. Soc. Corn., v. 168, 173, 279, &c.

A consideration of the whole subject leads us to the conclusion that the effects of joints and faults upon scenery can hardly be over-estimated, and the more the scenery is studied in detail, the more evidently will this be recognized. It is quite natural that this should be so, as a little consideration will show.

A joint is, from the nature of the case a line of weakness, and where these most abound there will be the greatest susceptibility to denudation. Mechanical denudation will be facilitated because the rock is so much more readily abraded and reduced to pieces small enough to be removed, and chemical destruction because the amount of surface is proportionately so greatly increased. In this way depressions of the surface and indentation of the coast line are to a great extent produced.

Sometimes however, and very frequently where joints are developed into fissures, the rocks become greatly hardened (silicified) by the circulating mineral solutions. In such cases they are often so well able to resist denudation as to stand up above the general surface of the country.

When the joints develop into fissures, and finally into faults, the surface irregularities are heightened by the juxtaposition of dissimilar rocks which is thus occasioned.

A depression once formed tends constantly to enlargement, because the rain-wash becomes concentrated in it, and finally, when the valley has been cut down nearly to sea level, alluvial deposits are laid down in it, which hide the faults under accumulations of detrital matter.

The foregoing remarks apply exclusively to the scenic effects of faults and joints; in a future chapter reference will be made to the super-added effects due to the presence of ore deposits.

Faults and Geological Maps. In all accurate geological maps which are drawn on a moderately large scale, the positions of the various faults are clearly indicated by abrupt interruptions of the lines which bound the various colours, and often by the simultaneous termination of two or more colours. A moment's reflection will show that this must necessarily be the case; it is in fact so general, that assuming the accuracy of the surface colouring, when such abrupt change or terminations occur, we

can not only mark out the true direction and position of the faults with a great degree of accuracy, even when they have not actually been anywhere seen, but also, in most cases, determine their inclination or underlie. The abrupt termination of the Plymouth limestones to the westward, for instance, long ago suggested to Sir Henry Delabèche; the existence of one or more N.S. faults with eastern underlie, somewhere in the neighbourhood of the Tamar, and the working of the mines in the neighbourhood has fully shewn the accuracy of his views.

PRINCIPAL LANDOWNERS IN CORNWALL, A.D. 1165.

By WILLIAM SINCOCK.

INTRODUCTION.

“At the time of the Domesday Survey, the landed property of Cornwall was chiefly divided between the King; Robert, Earl of Mortain, in Normandy, and of Cornwall, and those who held under him; the Bishop of Exeter, and some monasteries and colleges.”

Being desirous of ascertaining the origin of the families who held land, about a century after the conquest, in the county of Cornwall, I began with the owners when the Exeter Survey was taken, *i.e.*, before 1083, and found that it was only in a few instances that descent could be traced or inferred. The Earl himself; *Rainaldus de Valletort*; *Ricardus Dapifer*; *Hamelin*, supposed to have been the ancestor of the Trelawny family; *Alured* and *Nigel*, presumed ancestors of the Roscarrocks; *Blohin*, of the family of Bloyou; and *Erchenbald*, progenitor of *Flandrensis*, or Fleming; were all that could be discovered.

As these were only seven in number, I had recourse to the next record obtainable, which contained, including Earl Reginald's, about 23 names in all. This record, the Black Book of the Exchequer, was drawn up for the collection of an Aid on the marriage of Matilda, the eldest daughter of King Henry the 2nd, to Henry the Lion, of Saxony, ancestor of the house of Brunswick. A royal writ was, in 1165, addressed to all the tenants-in-chief, requiring from them an account of the knights' fees which they held, and the services due upon them; the collection of the money, however, was not finished until the summer of 1169, a year and a half after Matilda's marriage.

The aid levied was a strictly feudal impost, assessed at one mark, or thirteen shillings and four pence, on every knight's fee. The total number of knights' fees returned by the Earl, as of

his Barony of Cornwall, was 215½; and reckoning 13s. 4d. for each fee as the assessment, the total amount was £143 11s. 1½d. This sum, small as it now appears, was in reality a large amount, considering the population of the county at that time, when wheat was only 4½d. per bushel, and the daily pay of farm labourers was only two pence.

A knight's fee was land sufficient in extent and value to support the dignity of a knight. At this period an income of £15 per annum was required; but in later times £20, and even £40 was the annual value of a knight's fee. Why the Domesday Survey was not used as the foundation for this assessment, having, with a few modifications in practice, served as the rate-book of the whole kingdom for 80 years, was because it was at last found inadequate for the present purpose, owing to the frequent changes and subdivision of properties, which had, during that period, taken place.

This account of the possessors of land is necessarily a small "*Collectanea Genealogica Cornubiensis*," and it would swell its limits too much if all the authorities were duly acknowledged. I may, however, mention Lysons, Polwhele, Bond and Maclean, as also, Lake's History of Cornwall, as having been of great assistance in my researches; and to some extent, Eyton's antiquities of Shropshire, a very valuable work, which has been useful with regard to the Botreaux family. I should be glad if some able antiquarian would do for Cornwall what Eyton has done for Shropshire, and on the same plan.

PRINCIPAL LAND-HOLDERS OF CORNWALL,—11th HENRY II,
(1165—1166).

The earliest record, after the Domesday Survey, which furnishes us with any account of the principal land-holders of Cornwall, is the *Liber Niger Scaccarii*, or Black Book of the Exchequer, which is mainly the result of an order made, in 1165, on every tenant, *in capite* of the Crown, to return a list, before the first Sunday of Lent (March 13th, 1166), of all who held under him by knight-service, stating whether such tenure was

of old or new feoffment; *i.e.* whether it had existed from the days of Henry I or had arisen since.

Reginald de Dunstanville, son of King Henry I, by Sybel Corbet, his concubine, was, at this time, Earl of Cornwall, and returned the names of twenty persons who composed his Barony, holding in all 215½ knights' fees. The first in the list is the name of—

1. *Ralph de Valletort*, who holds 59 knights' fees in Devonshire and Cornwall, (*tam in Devoniam, quam in Cornubiam*). In 1086, the greatest land-holder under the Earl of Moreton was *Rainaldus* or Reginald, who held 39 manors, including the manor and castle of Trematon. There can be no doubt, says Lysons, that this was Reginald de Valletort, who is known to have possessed the manor and honor of Trematon in the reign of William Rufus; Harberton, near Totnes, was the head of their Devonshire barony. Ralph was probably grandson of Reginald mentioned above. In a scutage-roll (1196—1204), Reginald de Valletort, son, probably, of Ralph, holds 51 fees: in a later scutage-roll (1213—1220) he again holds 59 fees, and Alice de Valletort, one fee.

In 4th Edward I (1275), Roger de Valletort, the last of the family of that name, resigned his right and interest in the manor and castle of Trematon, with the appurtenances, to Richard, Earl of Cornwall.

In 1289, Roger died, bequeathing his large landed property to his two sisters. Isabel married, first, Alan de Dunstanville; secondly, Thos. Corbet, Sheriff of Shropshire in 1249. The other sister and co-heir married Pomeroy, of Berry-Pomeroy in Devon, and Tregony castle, Cornwall. In 9th Edward II (1315), Peter Corbet, grandson of Isabel, joined with Henry de Pomeroy in petitioning parliament for the recovery of the manor and honor of Trematon, alleging that when the said Roger made the deed of gift in favour of Richard, Earl of Cornwall, he was not *compos mentis*. In 1327, Corbet and Pomeroy renewed their suit; but apparently without success. In 1339, Henry de Pomeroy, in consideration of an annuity of £40, released to Edward the Black Prince all right and title, as heir of Roger de Valletort, to the honor and castle of Trematon.

2. *Richard de Lucy* holds "*de antiquo feodo*" 10 fees, and 9 fees of Adam Malherbe, "*de feodo Adæ Malherbe*." This Richard de Lucy, *alias* Iacam, temp. King Stephen, was a person of considerable note; and in 1st Henry II (1154), was made a Justiciar or Chief Justice of England; an office which he held until 1179, in which year, on 14th July, he died. In a document, temp. Henry II, he is denominated *Richard de Lucy, de Triveren* (Truro), and is said to have resided in the castle, which it is supposed he built. This castle was situated at the top of Pydar street; the mound on which it stood alone remains, and is now used as a cattle-market-place. In 1140, de Lucy, who had conferred considerable privileges on Truro, and probably made it a free borough, resigned possession of the castle in favour of Reginald, Earl of Cornwall. He confirmed to the burgesses all the privileges which Richard de Lucy had granted to them; and retained all that Lucy had possessed, until his death, 21st Henry II (1174-5). The manor of Truro passed in moieties to the co-heiresses of Lucy; one moiety was given by Rohesia, one of the co-heiresses, to William de Briewere, a powerful baron, who had great influence with King John. The lands granted by Rohesia to de Briewere, were:—"Trewrok, Menely, Trenant, a moiety of Treglasta and Truro with its advowson, and nine knight's fees which William de Botterel held of the honor of Richard de Lucy." This moiety afterwards fell to the family of Hiwis or Hewissh, and, by successive female heirs, to Coleshill and Arundell; among the co-heirs of the latter family it became subdivided. The other moiety passed, by marriage, from Lucy to *De Ripariis* (Rivers), and was conveyed by John de Ripariis, before 1302, together with the castle of Truro, to Thomas, son of Reginald de Prydyas, knight (Prideaux). Richard de Lucy, by his wife Rohais, left two daughters, co-heiresses:—(1) Maude, married, first, to Walter Fitz-Robert; and, secondly, to Richard de Ripariis. (2) Rohais, or Rohesia, married, first, to Fulbert de Dover; and, secondly, to Richard de Chilham.

In the scutage-roll (1213-20), Robert Fitz-Walter is said to have been possessed of eleven knights' fees, which had belonged to his uncle, Richard de Lusti (Lucy). In the same roll, Robert Peverel is said to have held nine knights' fees, "*de feod ejusdem*,"

i.e. "*de feod Ric. de Lusti*." Lysons supposed Peverel to have held these fees as trustee, probably, for Rohesia de Lucy, and he states that the mother of Fulbert de Dover, Rohesia's husband, was one of the co-heiresses of Pain Peverel, of Cambridgeshire. Adam Malherbe, of whom de Lucy held 9 fees, was of a family settled at Fenyton, near Honiton. This manor they continued to hold, from this date, for thirteen generations, until the reign of Henry VII, when the family terminated in an heiress, who married Ferrers. Geoffry de Malherbe, temp. Edward III, acquired from the Dean and chapter of Rotomagus (Rouen) 200 acres of land at Ottery, St. Mary, parcel of the manor of Vyneton-Malherbe. The manor and hundred of Ottery, St. Mary, were given, by King Edward the Confessor, to the cathedral church of St. Mary, at Rouen. John Grandison, Bishop of Exeter, having procured it of the Dean and Chapter by exchange, in 1334, founded here a college of secular priests. Richard Malherbe, great grandson of the above-named Geoffry, had a daughter and heir, Margery, who married Thos. Carhurta, of Devon, gent.

3. Robert Fitz-William holds 51 knights' fees; and of Walter Hay, 20 fees. This Robert was grandson of Richard, steward of the household, who, in 1086, held 29 manors in Cornwall, and whose son, William Fitz-Richard, had large possessions in the county; the daughter of this William was married to Reginald, Earl of Cornwall, consequently Robert Fitz-William was brother-in-law of the Earl. These descendants of Ricardus, of Domesday, were all possessors of the manor of Tywardreth, and benefactors to the Friary there; which, probably, was founded by Ricardus Dapifer himself, son of Turolde. In 1169, only three years after the date of this record, Robert Fitz-William joined in a deed with Agnes, his wife, and Robert, his son, granting the glebe of St. Austell to the priory of Tywardreth. Robert, the son here mentioned, died, probably, *sine prole*. Richard Fitz-William, whose name occurs later in this record, was probably a younger brother of Robert, who married Agnes; the sole heiress of Robert, Ysabella, appears to have brought the whole of his fees to Robert de Cardinan.

Walter Hay, under whom Robert Fitz-William is said to hold twenty of his knights' fees, in 1166, had, probably, a son of the same name, for, in a scutage-roll of not earlier than 1196, a Walter Hay is stated to hold 20 knights' fees in right of Agnes, his wife. Lysons says, "we have not been able to find anything further relating to this great land-holder, or who his wife, Agnes, was." However, in the "*History of Trigg-Minor*," we learn that Walter Hay (a probable grandson of the first-named Walter) held, of the family of Dynham, the manors of Pencarrow in Egloshayle, and Ammel in St. Kew, which, with other lands, he left to his granddaughter, Johanna, and the heirs of her body, with remainder, if she died without lawful issue, to her sister, Thomasine, and her heirs and assigns for ever. Johanna married Sir Richard Stapledon, knight, brother of Walter, Bishop of Exeter (1307-27). In 1301, on the death of Joceus de Dynham, Richard de Stapledon, we find, held of him half a fee in Pencarrow and Ammel, of the value of 100^s, and John Fitz-William held in Ammel, of Richard, the ninth part of a fee worth 60^s. This manor was derived from his wife's grandfather, Walter Hay, and seems to have been divided; one part designated Amal-eglos, from the chapel founded thereon, whilst the other part was called Amal-Richard.

Johanna dying without issue, her sister and co-heir, Thomasine, who, before 1282, had married Bartholomew de Penhargarth, succeeded to her estates. The family of De Penhargard held the manor of Penhargard, in Helland, from which they derived their name, and also the manor of Polhorman and other extensive possessions in different parts of Cornwall.

4. *William de Boterell* holds 12 knights' fees.

William de Boterell (I) married Alice, daughter and co-heir of Sir Robert Corbet, of Alcester, county Warwick, whose other daughter, Sybell, was mother of Reginald, Earl of Cornwall. In 1131, this William Boterell (I) paid, in Cornwall, two shillings for a pardon (31st Henry I, Rot. Pip.), and died a few years after.

William (II) de Boterell, or Botreaux, his son, married, *circa* 1171, the Lady Isabella de Say. After her death, if not before, he confirmed, by charter undated, for the good of his

soul and the soul of William, his son, to God and St. Melburgh of Wenlock, and the monks there serving God, the gift which the Lady Isabella, his wife, had made upon the church of St. George of Clune.

Between 1166 and 1175, for the Earl died in the latter year, Earl Reginald confirmed to William Boterell, described as son of Alice Corbet, grantor's mother's sister, by an undated charter, all the lands which he had given William Boterell his father, in Cornwall: viz., Penhale (Penheale in Egloskerry) and Widemue for his services, and Cracumton and Bidum as a marriage-portion with the grantor's aunt. The names of the witnesses to this charter are:—

1. Bartholomew—bishop of Exeter, consecrated 1161—died 1184.

2. R. abbot of Malmesbury.

3. Nicholas de Dunstanville—son of the Earl.

4 & 5. Pagan and Roger—the Earl's chaplains.

6. Herbert Fitz-Herbert—whose first wife was Sybilla Corbet, the mother of the Earl.

7 & 8. Baldwin and Richard—(*nepotibus meis*) grandsons of the Earl, being sons of Richard de Redvers, 3rd Earl of Devon (ob. 1162) by Dionysia de Dunstanville, daughter of Earl Reginald.

9. William de Redvers—surnamed “de Vernon,” brother of the aforesaid Richard.

10. William—brother of the Earl, surnamed “de Tracy.” He is named in the scutage-roll (1196—1204) as holding 4 fees: these appear in the scutage-roll (1213—1220) to be held by Henry, son of William (De Tracy).

11. Hugh de Dunstanville.

12. Hugh de Valletort.

13. Nicholas Fitz-Geoffry—who, in the scutage-roll (1196—1204), is returned as holding 10 knights' fees.

William de Boterel (II) is supposed to have died very early in the 13th century, *circa* 1211. The following particulars of his career are from *Maclean's Trigg Minor*, Vol. I, p. 632. "In 12th Henry II (1166), William (II) de Boterell rendered an account of £32 of "Old mercy," for which he originally owed the King £60, and in the 33rd year of the same King (1187) he paid scutage for twelve knights' fees in Cornwall, because he had not accompanied the king in his expedition into Galway in the preceding year. In 1199, he gave King John £200 and two goshawks for having seizin of his land in Penhal, and half the ville of Alencestre, and for the confirmation of the charter which he had of Earl Reginald; but it is stated that £100 is required of William Fitz-Alan in Shropshire, his attorney, for a fine made between the said William de Boterell and William the son of Alan" (or Fitz-Alan).

It may be here noted that Isabel, daughter and heir of Helias de Say, the Lady of Clun, had been the wife of William Fitz-Alan, who died some time before 1160; his son, of the same name, dying about 1172, was succeeded by his son William Fitz-Alan, who, in 1199 was attorney for William de Boterell in Shropshire, for which county he was at that time Sheriff. "William (II) de Boterell was sheriff of Cornwall from 1205 to 1209, and paid £233 4s. per annum for the farm of the county. In 1205, he gave the king two horses for the great saddle and one Norway goshawk for license to marry Albreda, widow of John de Ingeham and daughter of Walter de Waleran, in addition to 300 marks which she had previously given to have her own marriage."

"In 12th John (1211), William (II) paid scutage for twelve knights' fees, in Cornwall, for both the Scottish and Welsh expeditions," and died shortly afterwards. The Lady Isabel, his first wife, died in 1199. She was married three times—first to William Fitz-Alan, sheriff of Shropshire; secondly to Geoffrey de Vere, who died in 1170; and thirdly to William (II) de Boterell, who survived her 12 years. The property, represented by 12 fees, continued in the family of Botreaux from the time of Henry II till the reign of Edward IV (1462), after which it passed, by successive female heirs, to Hungerford and Hastings, and was sold to various persons by the Hastings, Earls of Huntingdon, in the reign of Queen Elizabeth.

5. *Roger de Mandavill* holds 4 *Knights' fees*.

"The estate of Roger de Mandeville," Lysons says, "must have been that which belonged to Queen Matilda, wife of William the Conqueror, and was part of the honour of Gloucester." The Queen, according to the Exeter Domesday, had four manors in her own hand, viz:—Conarditone (Conarton), Bennartone, Godeford and Melledham. She died in 1083, and the Exchequer Domesday of 1086, states that the King was possessed of those manors which had been settled on Queen Matilda. These manors formed parcel of the large possessions of Algar, Earl of Gloucester, whose estates descended to his son Brihtric, called "Brihtric 'Meaw" (snow) from the extreme fairness of his complexion. The career of Brihtric was most unfortunate. Having been sent to the Court of Flanders as an ambassador from England, Matilda, Princess of Flanders, became enamoured of him, but he declined her advances. She afterwards married William, Duke of Normandy, and upon the conquest of England by the latter, treasuring up the mortification she had suffered through Brihtric in her youth, she induced her husband to deprive Brihtric of all his possessions and confer most of them upon herself, Brihtric being cast into a dungeon at Winchester, where he perished, not without suspicion of poison. Thus we find that the four manors mentioned above, which, in the time of King Edward had been held by Brihtric, were, at the time of the Exeter Domesday, held by the Queen. The manors of *Carnarton*, in Gwithian; *Bennarton* (Binnerton) in Crowan; are readily identifiable. Of *Melledham*, called *Melioton* in a charter of Henry II, we find in 1283, that Alan Basset was Lord of *Malenelidan* (*Melidan*) the same, probably, as *Menalida*, which Cecilia, daughter of Alan de Dunstanville, brought to William Basset, it is said as a marriage portion. This William and Cecilia were the parents of Alan Basset, before mentioned.

In 1211, Robert Tintaiol (Tintagel) accounted for the scutage of Scotland for four fees which had belonged to *Roger de Mandeville*.

The Mandevilles were Earls of Essex, by special charter of King Stephen. William de Mandeville was 3rd Earl of Essex, and died in 1190. He had a younger brother named *Robert*.

6. *Richard Fitz-William* holds 5 *Knights' fees*.

There were two Fitz-Williams, probably brothers, in the reign of Henry II, one of whom has been mentioned previously as holding 71 knights' fees; this Richard held what was, probably, a younger brother's fortune—5 fees. John Fitz-William, who, in 1301, held of R^d de Stapeldon in Ammel the ninth part of a fee worth 60^s, was probably a descendant of Richard Fitz-William, and resided at Hall, in Lanteglos-by-Fowey. His daughter and heir, Elizabeth, was married to Sir Reginald Mohun. The Mohuns inherited from the Fitz-William family, the manors of Tolcarne and Bodinnick, also the barton of Hall.

7. *Gralanus* holds seven *Knights' fees*.

No person of this name can be found; but in the Scutage roll, about 35 years later, Alanus Blundus (Bloyou) is stated to hold the same number of fees, and he may have been the immediate successor of *Gralanus* or *Alanus*.

The family of Bloyou was descended from Blohinus, who held five manors in Cornwall at the time of the Domesday Survey, viz:—*Deliau* or *Deliomur*, in St. Teath; *Duvenant* now Dannand, also in St Teath; *Treuthal* now Truthal, in Sithney; *Trevehoret* now Trehudreth, in Blisland; and *Trefroic*, now Trefreake, in St. Endellion. In 5th Stephen (1140) we find that Richard, son of Bloihou paid a fine in Cornwall. (Great Roll of the Pipe).

This family became extinct early in the 14th century, for when Sir Ralph Bloyou, Knight, died s.p., his sisters, Elizabeth and Johannah, became his heirs; Elizabeth married first, Sir Stephen de Tinten, by whom she had a daughter Alice, who became the wife of Sir Walter Carminow; and secondly she took to be her husband Ralph Beaupré. It is not known to whom Johannah was married, but she had a daughter Margery, whose son, Simon Berkle, espoused Margery, daughter of Sir Oliver Carminow.

In the 'Introduction to the Year-Book,' 30 Edward I, (1302) the following notice occurs:—"The Bloyho family seem to have been very turbulent. Sir Ralph Bloyou was concerned

in a grave case of assault and trespass, and was, I think, the same who underwent the *peine forte et dure*. The Iter Rolls contain entries regarding two others who had committed various offences. A note in the margin of the Roll states that he who suffered the *peine forte et dure*, died in prison. His death may well be concluded from the severe nature of the punishment."

This Sir Ralph was great grandson of Alan Bloyou of this record, and must have been about 60 years of age in 1302, as his father Alan married the daughter of Sir Henry Brodrugan, 30th April, 1241.

The 'strong and hard pain' which is denoted by the words "*peine forte et dure*," was a species of torture, used by the English law, to compel persons to plead, when charged judicially with crimes less than treason, but amounting to felony. According to the best authorities, it is not until the reign of Edward I that the first traces of it appear in the history of English law, when the punishment consisted merely of severe imprisonment, with a diet barely sufficient to prevent starvation, until the offender repented of his contumacy and consented to put himself upon his trial. Fleta, writing about 1285, describes the punishment to be, that 'the party shall be cast into prison and lie upon the bare ground, clothed with a single garment and barefooted; that he shall have for his food only three morsels of barley-bread in two days; that he shall not drink every day, but that on the day when he shall have no food, water shall be given him to drink.'

8. *Richard, son of Alvredus, holds one Knight's fee.*

In the Exchequer Domesday, *Alvredus* held of the Earl *Hiltone* (Hilton in Marham church); *Tirleebere* (Thurlibeer, in Launcells); *Brecilsberge*; *Landseo*; *Orcet*, in Kilkhampton; *Borge*; and *Roscaret*, (Roscarrock, in St. Endellion).

In the Exeter Domesday before 1083, *Roscaret* and eight other manors were held under the Earl of Nigel; *Roscaret* and six other manors were at the same time held by *Alvred*. Nigel's *Roscaret* was of the value of 15/- *Alvred*'s *Roscaret*, formerly 10/- then worth only 2/-. Both these manors in the Confessor's time were held by *Alwin*. At an early date, the manor of

Roscaret appears to have been divided into two; *Roscarrock-mur*, (great) and *Roscarrock-bighan*, or *Roscarrock-vean* (little), but both continued in the name and family of Roscarrock during several centuries, until 1673. Alured and Nigel, successors of Alunim, appear to have been of the same family, undisturbed by the Conqueror in the possession of their property, and to have transmitted Roscaret to their posterity.

"*Ricardus filius Aluredi*," of this record, we may safely consider to be Roscarrocks, although the name '*de Roscaret*' does not appear until the time of Richard I, in the first year of whose reign (1189-90) Walter de Roscaret was amerced in half a mark for a breach of the forest laws; and in 6th Richard I, a similar amercement is recorded in the Great Roll of the Pipe. In 5th John, he was again amerced in 5 shillings. In 1202, 3rd John, *Walter de Roscares* (Roscarrock) suffered a fine to John de Eglosheie (Eglosheyle) of one acre of land in Hevenant, and, in the same year, a certain *Magister Aluredus* levied a fine of Chrispinus of an acre of land, in *Roseroockbigan*, and Chrispinus quit-claimed all his right therein and in the capital messuage of *Roseroockbigan*, &c.

In 1299, we find Richard Roscarekmur one of the jurors on the Inq. p.m. of Edmund, Earl of Cornwall. In 1302, he is at the assizes at Launceston, petitioning against William le Bere. He is, probably, a great grandson of Walter de Roscaret, temp. Richard I, mentioned above. His wife was Isolda, daughter of Ralph Gifford, by whom he had issue, William, his son and heir, who married Eve, daughter and heir of Laurence Arundell of Bleyboll, by Margery le Flamanc, daughter of Sir Robert le Flamanc, Lord of Nantalan. This Laurence was son of Sir Remfrey Arundell by Alice de Lanherne.

9. *Geffrey, son of Baldwin*, holds 10 *Knights' fees*.

Before 1083, *Thurstin*, the Sheriff, is described as holding twenty-seven manors in Cornwall. *Baldwin Fitz-Thurstan* gave to the priory of Tywardreath the church of Lanlivery, '*ecclesiam de Latilutry*,' and three acres of land. The manor of Bodardle, the *Bothardar* of Domesday, was one of those held by Thurstin, and was situated in the parish of Lanlivery. *Geffrey*, of this

record, was probably his son, and the father of *Nicholas Fitz-Geoffry*, a witness to the confirmation charter to William Boterell by Earl Reginald. This *Nicholas Fitz-Geoffry*, in the Scutage roll (1196-1204) appears as holding 10 knights' fees; his father, *Geoffry Fitz-Baldwin* having died between 1166 and 1196.

Baldwin the Vice-Comes of the Earl, or Comes, in 1086, married Albreda, daughter of Richard, surnamed Goz, Count of Avranch, son of Turstin, and had, with other issue, Richard, surnamed De Reviers, (Redvers) who was created earl of Devon, by King Henry I. This Richard first Earl of Devon; died in 1137, and was succeeded by his eldest son, Baldwin de Redvers, as second Earl of Devon, who died in 1155, and was succeeded by his son, Richard de Redvers, third Earl of Devon, who married Dionysia, daughter of Reginald Earl of Cornwall, and had two sons, Baldwin and Richard. The third Earl of Devon died in 1162, and his sons are found among the witnesses to the confirmation charter above mentioned, as also the name of William de Redvers, afterwards sixth Earl of Devon, Baldwin and Richard, successively fourth and fifth earls having both died s. p. It is very probable that Baldwin of this record was of the family of De Redvers, whose son, Geoffrey, held the goodly number of ten knights' fees.

The ten fees held in 1166, by *Geoffrey Fitz-Baldwin*, and in 1196, by *Nicholas Fitz-Geoffrey*, seem by a scutage roll in the Red Book of the Exchequer, dated probably 1213 to 1220, to have passed into the hands of *Thomas de Middleton*, who is therein stated to hold ten knights' fees of the Honor of Middleton. *Sir Richard de Grenvill*, whose father married *Gundreda*, and died before 1205, is supposed to have married the heiress of *Thomas Fitz-Nicholls de Middleton*, and to have died circa 1217. The name of Grenvill first occurs in Cornish records, 40th Henry III (1255), when Richard de Grenville, son of the last mentioned, appears to have been the largest land owner, being possessed of fifty librates of land. Lysons says "that these ten fees '*de honoure de Middleton*,' were granted by King John, in 1203, to William Briwere; and this property of course we trace no farther."

10. *The Prior 'de Triwardreit' (Tywardreath) holds one Knight's fee.*

The Benedictine Priory of S. Andrew at Tywardreath was subservient to the abbey of SS. Sergius and Bacchus at Angers, the former capital of Anjou. The founder is not known, but there is good reason to suppose he was Richard, Steward of the Household, styled in Domesday, *Ricardus Dapifer*, holding then twenty-nine manors. *Donechenio*, (Downeckney) a manor in the parish of Treneglos, was one of these, and the said Richard gave the church of '*Trenegles*,' so early as the time of the Conqueror, to the priory of Tywardreath. This Richard was the grandfather of Robert Fitz-William, whose sister was the wife of Earl Reginald. Refer to (3).

The prior at this time was Osbert who was one of the witnesses to the confirmation of Treneglos church by Bishop Chichester at Bodmin, anterior to February 14th, 1154.

11. *Ralph de Tremodret holds two Knights' fees.*

The manor of Tremodret in the parish of Roche, retains its Domesday name; in the time of Edward the Confessor, it was held by *Godwin*; and in 1083, by *Hamelin*. In the Scutage-roll (1196-1204) *Ralph de Rupe* (Roche) held three knights' fees; he was probably, son of *Ralph de Tremodret*. In 25 Edward I (1297) Odo de la Roche is recorded as being the owner of lands worth £20 or more per annum; it may be reasonably supposed that he was the last of the family.

In the Roll of the Seizin, Launceston Castle, 11th Edward III, (1337) *William de Bodryngan* (Bodruga) holds in Tremodret. This William de Bodruga, was son of Sir Otho de Bodruga and Margaret his wife, to whom a certain Herbert de Skewyek granted the manor of Tremodred, and other lands, which had passed to him from the family of Bloyou. Sir William de Bodruga died without issue male; his only daughter Elizabeth became the wife of Sir Richard Sergeaux, Knt., whose father dying in 1362, he was called upon to pay the relief for 3½ knights' fees in Tremodret which had belonged to William de Bodruga. Sir Richard Sergeaux had by his wife, Elizabeth Bodruga, a daughter, named Elizabeth after her mother, who

died in childhood, but because he had issue, he held the Bodrugan estates for the term of his life, according to the law of England and upon his death in 1393, they reverted to the heirs of Bodrugan; at the attainder of Sir Henry Bodrugan, Knt., in 1487, Tremodret, with other lands, was granted by Henry VII to Sir R. Edgecumbe, ancestor of the Earl of Mount Edgecumbe, the present proprietor.

12. *Daniel de Botton hold one and a third Knight's fee.*

The manor of Boyton is doubtless the *Boistone* of Domesday, which had been purchased by Sitricius, abbot of Tavistock, for that abbey, prior to the Conquest; before the death of his successor, Gaufridus, who died 1088, it had been forcibly taken possession of by Earl Robert. Subsequently 2nd Edward II (1308) Henry de Bodrugan died seized of this manor. Afterwards it was part of the possessions of the Priory of Launceston, as early as 20th Edward III (1346).

13. *William, brother of the Earl, holds four Knights' fees.*

This William, surnamed 'de Tracy,' brother of Earl Reginald, was another natural son of King Henry I, and his name as a witness appears in the charter. (vide No. 4 ante). In 4th John (1203) Henry, surnamed Fitz-Count, gave twelve hundred marks for the lands of William de Traci; which lands Hugh de Courtenai and Henry de Traci afterwards enjoyed. This Henry Fitz-Count was the elder of two illegitimate sons of Beatrix de Vaus, lady of Torre and Karswell, by Reginald Earl of Cornwall. In Scutage-roll (1196-1204) William, *frater Comitis*, is returned as holding four knights' fees, and must then have been advanced in life; his father, Henry I, having died in 1135. William probably died before 1213, as in that year, Henry, son of the Earl, is named in the Scutage-roll as holding one knight's fee; he must have been dead as early as 4th John.

14. *Ralph de Borehard holds two Knights' fees.*

Reginald, Earl of Cornwall, between 1140 and 1175, granted to the monks of Scilly, all wrecks; whales and whole ships being excepted; and confirmed the grant, which is still extant,

of his father Henry I, to the abbey of Tavistock, of all the churches of *Sullye*, with their appurtenances, and the lands which had belonged to the monks and hermits temp. Edward the Confessor. This Confirmation charter of Reginald's is witnessed by *Radulphus de Bosco-Roardi*, who is, we have no doubt, the Ralph stated above, as holder of two knights' fees. In the Scutage roll, (1213-20) *William de Bosco Roardi* hold two knights' fees, and was probably, son of Ralph. In 1337 we find William of Rowardswood holds in Hemmeston, in Devon, of the honour of the castle of Launceston. The name of *Bosca-Roard*, Anglicised Rowards-wood, is found in the Dives roll, answering to our Battle-abbey roll, Roger de Bosc-Roard; and Guilhaume du Bosc-Roard.

15. *Hoel and Jordon* hold *three Knights' fees*. Not identifiable.

16. *William de Dun* holds *one Knight's fee*.

The manor of Sheviock anciently belonged to the family of D'Auny, or Dawney; Sir Payn D'Auny, of D'Auny Castle, in Normandy came in with the Conqueror. Sir William D'Auny, probably the *William de Dun*, of this record, was made a General at Acon, now Acre, 4th Richard I (1192). Having slain a Saracen prince, and afterwards killing a lion, he cut off its paw, and presented it to the king, who, in token of approbation, took the ring off his finger and presented it to the knight, and ordered that he should bear as his crest a *demi Saracen* with a lion's paw in one hand and a ring in the other; the family crest to the present day. The ring is still preserved. The heiress of Dawney was married to Sir Edward Courtenay, *circa* 1370.

17. *Henry de Pomeria* holds *three Knights' fees*.

"*Ralph de Pomeria* obtained from the Conqueror, fifty-five lordships in Devon, and two in Somerset. La Pomerai, in Normandy, from which he derived his name, is situated on the river Orne. Ralph's son, *Joscelin*, in 25th Henry I (1124) gave to the Abbey of S. Marie du Val, in St. Omer, Normandy, the churches of Berry Pomeroy, Stockleigh-Pomeroy, together with other lands in the county of Devonshire, and in Normandy. Joscelin's son *Henry de Pomerai* (1) was living in 1124, when he assented to the aforesaid gift by his father." He is mentioned

by Ordericus Vitalis as "*Henry, son of Joselin de Pomeré*, stationed at Pont-Antou," (at the confluence of the Risle with the river of Antou) during the winter, 1123-1124, when there was a cessation of Arms, and King Henry I garrisoned the fortresses, entrusting them to his best officers, among whom was *Henry de Pomeré*. In 1137, he was witness to a deed in Normandy. In 1155, he was charged for Danegeld in Devonshire; and in 1164, he paid £7 12s. 6d. for the scutage of Wales. Soon after 1166, when he was returned as holding three fees in Cornwall, he probably died. His wife, *Rohesia*, was a sister of Reginald, Earl of Cornwall, but there is no evidence to show whether she was a daughter of Henry I, or of Herbert Fitz-Herbert, his Chamberlain. Sibilla Corbet was undoubtedly mother both of Reginald, Earl of Cornwall, and his sister Rohesia. She survived her husband, and in 1214, presented to the church of Stockleigh Pomeroy in right of her dower. In 1175 she owed three marks "*pro foresta*." *Joscelin de la Pomerai*, described as nephew of Herbert and William Fitz-Herbert, and of Reginald, Earl of Cornwall, was her second son. Their eldest son, *Henry de la Pomerai* (II) gave land to the Priory of St. Nicholas, at Exeter, "*Rohea, matre mea*" and "*Joscelin, fratre mea*," being witnesses. It was this Henry who joined John, Earl of Mortain, in his rebellion against King Richard his brother, and seized St. Michael's Mount. He died *circa* 1195. His first wife was *Matilda de Vitrie*, from whom the Pomeroyes of Berry-Pomeroy derived their descent. He married secondly *Rohesia*, sister of Doun Bardolf, whose second husband, John Russell, claimed lands in right of his wife, against Henry de la Pomerai, 2nd John (1201) and he and Rohesia, his wife, in 15th John (1214) claimed to present to the church of Stockleigh against the abbot of Valle. These claims being in respect of Rohesia's dower as widow of Henry de la Pomerai." Note on Rohesia de la Pomerai, Vol. IX of this Journal, 1867, p.p. 273, 275,—gives full details, and has been used to illustrate this name.

18. *Richard, son of Osul* holds *one Knight's fee*.

Not identifiable. Osulf held land T.R.E.

19. *Eiulphus* holds *one Knight's fee*.

Eiulfus occurs in the Confessor's time, as holder of the manor of Treurgen; in 1083, Joinus was owner. The name of *Eiulfus* occurs only once in Domesday.

20. *Erkenbald son of S....holds eight Knights' fees.*

Erchenbald held at the time of the Domesday Survey, six manors in Devonshire, and 3 in Cornwall. Among those in Devonshire was *Brotone*, now Bratton. His son "*Stephen Fitz-Archembald*, Lord of Bratton, paid a fine of ten silver marcs to the King for trespass, 4th Stephen (1139); and in 1145, he witnessed the charter of Henry de Tracy to the abbey of Barnstaple by the name of Stephen of Flanders, his son, *Archembald* being also a witness." *Stephonus Flandrensis et Archembaldus filius ejus.*" Stephen had two sons, *Archembald* who succeeded him; and *Baldwin*. *Archembald* of Flanders was in 11th Henry II (1165), returned as possessor of the family estates which he held "*devoteri feoffamento*," viz:—whereof his ancestor had been enfeoffed in the reign of Henry I. He attended Henry II in his invasion of Ireland, and obtained the lordships of Astmayn and Eskertenen, in Tipperary, and and Newcastle and Slane on the river Boyne, from the latter of which he and his male descendants took their title of honour. He was a great baron of Ireland, and that dignity subsequently known as that of a lord of parliament, continued to be enjoyed by his descendants until they were excluded from their seat in parliament by the penal laws; a period of more than five hundred years. This *Archembald* we take to be the "*Erkenbald*" son of S.... (Stephen) of this record. He and his brother *Baldwin*, are witnesses, (*Erkenbald and Baldwin Flandrensis*) together with William de Bottreaux, to an undated charter of *Hug' Ralegh de Netelcomb*. *William des Botoraus*, (as styled in this document) was, probably the sheriff of Devon, 1158-60, who married Alice Corbet,—vide (4). *Erchenbald*'s brother *Baldwin*, instead of going to Ireland with Henry II in 1171, appears to have attached himself to the good King David I, and was the ancestor of the Flemings, Earls of Wigton. He was rewarded by a grant of the lands of Biggar, in Lannark, of which county he was sheriff in the reigns of Malcolm IV, and William the Lion. In acknowledgement of their common origin with the

Flemings of Slane, in all the settlement of their estates, the Lords Slane, after the union of the crowns of England and Scotland, made remainders on failure of the prior branches, in favour of the Earls of Wigton.

The last Baron of Slane died in 1726, without male issue, being the twenty-second inheritor of the title. The Earldom of Wigton became extinct in 1747. *Sic transit gloria mundi.*

CORNISH LANDHOLDERS *circa* 1200.

By WILLIAM SINCOCK.

In Carew's Survey we find two Scutage-rolls, extracted from the Red Book of the Exchequer. These are not dated, but, from internal evidence, it is apparent that one of them could not have been earlier than 1196, as the date of 8th Rich. I. is referred to; the other could not have been previous to 1204, as, in that year, Robert Fitz-Walter succeeded to the Cornish fees of his maternal uncle, Geoffrey de Lucy. Lysons found it "difficult to say which is the earlier of these." There is no question, however, but that the first-named record is the earlier of the two, the date of which may be fixed between 1196 and 1204, as Alan Blund (Bloyou) is stated to hold 7 fees, and he died in 1204, as did also Geoffrey de Lucy, both being therein named.

The second roll, evidently the later record, contains the name of Archemaund Flandrensis whose fees appear in the first rolls as being held by Stephen Flandrensis, who died in 14th John. We may therefore safely place Roll A as between 1196-1204; and Roll B. 1213-1220.

The scutage, being a payment in lieu of personal service, was first taken in the 5th Hen. II. In 1195, a scutage of 20/- on the knight's fee was imposed for the war in Normandy, and almost immediately after, in 1196, another scutage was levied, and this is probably the one we are about to elucidate so far as it relates to Cornwall.

Although compiled within a few years of each other, these rolls shew great changes, and give us the names of landholders at the close of the 12th and beginning of the 13th centuries.

ROLL A, 1196-1204.

Names of Barons and Knights from the Rolls of Knight's Fees, or Scutage-rolls, temp. King Richard I, in the Red Book of the Exchequer.

CORNUBIA.

1. *Walter Hay*, 20 knights' fees in right of Agnes his wife.

In the *Liber Niger*, 1166, Robert Fitz-William is said to hold 20 of his knights' fees under Walter Hay; and now, 30 years after, we find the same number of fees held by the same Walter, or his son, in right of his wife. Walter Hays held the manors of Pencarrow and Amaleglos, and other lands. Refer to full account in "*Cornish Land-holders, 1165.*"

2. *Nicholas Fitz-Geoffrey*, 10 knights' fees.

In 1165, Geoffrey Fitz-Baldwin held the same number of fees which his son probably now holds. Nicholas Fitz-Geoffrey tested a deed of Earl Reginald, undated; this charter confirmed to Will de Boterell the grant of lands which had been given to his father by the earl, and must have been made between 1166 and 1175 (vide Middleton, Roll B., for descent of these fees).

3. *William Boterell*, 12 knights' fees.

William (II) de Boterell was the son of William de Boterell by Alice Corbet. He married Isabella de Say, *circa* 1171, and confirmed, by charter undated, the gift which the Lady Isabella, his wife, had made upon the Church of St. George of Chines. One of the witnesses to this charter is Roger Anglicus, No. 15, post. (See Maclean's *Trigg Minor*, Vol. I, for Botreaux family history).

4. *Alan Blund*, 7 knights' fees.

This is Alan Bloyon, the spelling of names in these ancient records is very erroneous. In 1204, Alan died, and Henry, his son, paid his relief for the 7 fees which his father, Alan, had held in Cornwall. Henry died s.p. and was succeeded, in 1210, by his brother Ralph, named in Roll B, thus establishing the priority in date of this Roll. The family of Bloyon was descended from *Blehin*, who held five manors in Cornwall at the time of the Domesday Survey.

5. *Gervas Fitz-William*, 5 knights' fees.

Henry, surnamed Fitz-Count, a bastard son of Reginald de Dunstanville, Earl of Cornwall, received from Henry II a grant

of the whole county of Cornwall, to hold in farm, which grant was afterwards, in 17th John, (1216) confirmed in fee. Henry Fitz-Count granted the manors of Hornicote and Tintagel to Gervas, called therefrom "*de Hornicote*," which Gervas, in 1198, was amerced in Cornwall, for a breach of the Forest Laws. In 1199, he gave 100^s of fine to be excused from going beyond the seas with the King, and in addition, paid 41^s 8^d scutage for 2½ fees for the king's coronation. In 1204, he paid scutage for five knights, as shewn above. In 1205, he paid a fine of 20 marks for the fees of 5 knights; and in 1208, he gave two marks for a plea of forest. In this year he died, for the sheriff, *William de Botterella*, accounted for 40 marks received from Robert de Tintaioel to have the whole of the inheritance which was Gervas de Harnicote's, his father. This Robert de Tintajel appears in Roll B, a further proof of the date of this record.

6. *William, brother of the Earl*, 4 knights' fees.

This is a brother of Reginald, Earl of Cornwall, surnamed "*de Tracy*," and he was one of the natural children of Henry I. He witnessed an undated charter of Earl Reginald's, confirming to William de Boterell, son of Alice Corbet, grantor's mother's sister, all the lands which the Earl had given to William de Boterell in Cornwall.

7. *William Fitz-Richard*, 5 knights' fees.

In 1165, Richard, son of William, held 5 fees. William, son of Richard, now holds the like number. These were both of the family of Fitz-William, of Hall, whose heiress married Sir Reginald Mohun in the early part of the 14 century.

8. *Ralph de Rupe*, 3 knights' fees.

This Ralph was ancestor of the De la Roche family, and probably, son of Ralph de Tremodret, in Roche, who, in 1165, held two knights' fees.

9. *William Oliver*, 1 knight's fee.

We cannot trace this name. Jordon Oliver tested a charter in 19th Henry III. (1235), Robert de Cardinan to Priory of Tywardrait.

10. *Henry de Tredeleberge*, 1 knight's fee.

Perhaps *Tirlebere*, of Domesday, now Thurlibeer, in Launcells, held in 1086, by Alured, a probable ancestor of the Roscarrock family. This manor came into the family of Arundell of Trerice by marriage with the heiress of Durant. Lysons says of Thurlebere, of Thurlebere, in Stratton—extinct in the reign of Edward IV. The heiress married Arundell of Trerice.

11. *Richard, son of Juo*, half a knight's fee.

Richardus fil Juonis witnessed the charter of William Peverel, granting the church of St. Breward to the Priory of Tywardreth. Temp. Edward II. Roger le Jeu held the manors of Hamatethy and Trevisquite as lord thereof, and of him, by military service, did James Peverel hold "Hamatethe." In Roll B we find the same Richard Fitz-Juo holding a *whole* knight's fee. The family of Le Jew was settled in Devonshire at Cotleigh, near Honiton, which manor was successively in the families of Roche and Le Jew; from the latter it passed, by marriage, to Yeo.

12. *John de Soleigny*, * * * * *

About this period, and nearly contemporary with Robert de Cardinan of these records, we find that Andrew de Suleney owned a manor of Faweton, and on his death without issue, it devolved to his uncle Jeffry; he also dying without issue, it was inherited by his sisters in moieties. By marriage, one moiety passed to the Treverbys, the other, by a succession of female heirs, to the families of Champernowne, Whittington, and Wroth, (vide Escheats to about 8 Henry V, 1420). Isolda de Suleny, co-heir of her brother, Geoffry de Suleny, married, and had a daughter, Emma, who married Sir Walter de Treverbys. (Prideaux pedigree—Trigg Minor, Vol. II).

13. *Stephen Flandrensis*, 7 knights' fees.

In 1165, Erkenbald son of Stephen, held 8 fees in Devon and Cornwall; Erkenbald's son, Stephen Flandrensis (Fleming), now holds 7 fees. Stephen died 14th John, 1213 (vide Fleming, Barons of Slane, in extinct Peerage). "In the north aisle of the church of Botus-fleming, under a low obtuse arch, is the recumbent figure of a crusader, said to be Stephen le Fleming, who founded the church, temp. Richard I."

14. *Allan de Dunstavill*, 1 knight's fee.

The Scutage-roll as given by Carew, states Alan de Dunstanville held *one* knight's fee. Eyton in his "Antiquities of Shropshire," says that in 1187, he, Alan, was returned as holding *twelve fees in capite*, in Cornwall, (Lib. rub. Scaccarii, fo. xlix). In 1185-1186, Alan de Dunstanvill appears as having to wife the co-heiress of Emma de Langelot, which Emma, then aged 60 years, was of the race of "*Chedney and Joceline Crispin*." Her lands were in Buckinghamshire. The wife of Alan was then aged 30 years. This Alan's father, also Alan, seems to have been largely enfeoffed in Cornwall; probably during the time when the earldom was held by Reginald de Dunstanville (1140-1175).

In 1200, Alan de Dunstanville, son of Alan de Dunstanvill, Lord of Idsall, &c. in Salop, was lord of the manor of Tehidy, and granted a lease of Minwinnion, now the home farm within the park, to Paul Guyer. On the 5th September, 1216, King John empowers his beloved and faithful Alan de Dunstanvill to sieze the lands of William Basset which are of his fee, the said William being with the king's enemies. These lands appear to have been in Cornwall. Tehidy remained with the elder branch of the family long after the era of Alan de Dunstanvill (Eyton's Antiq. of Shropshire, Vol. II). This William Basset, lord of Ipsiden and Stoke-Basset, county Oxford, married Cecilia, daughter of Alan de Dunstanville, with whom he is said to have had Menalida, in Cornwall, as a marriage portion. She was dead in 1208, consequently William Basset was a widower in 1216, when with the enemies of King John. By his wife, Cecilia, whom he married *circa* 1205, he had one son, named Alan, after his grandfather. This Alan Basset, knight, married Lucia Peverel; and acquired the great manor of Tehidy by an exchange with his cousin, William de Engelfend, who, as well as himself, was grandson of Alan de Dunstanvill. In Roll B, Walter de Dunstanville succeeds his cousin, Alan, who, we may consider, was dead before 1220, the latest date assignable to that roll.

15. *Roger Anglicus*, 1 knight's fee.

Roger Anglicus (English) tested a charter of William de Boterell's confirming the gift of his wife. Vide No. 3. "Roger Anglicus was William Boterell's feoffee at Woolstaston, Salop; he died before 1209, leaving a son, John, and a widow Amilia," (Eyton, VI, 152). The Boterell's and de Dunstanvill's held in Shropshire as well as in Cornwall, and through them several new families were introduced to the West of England; notably the families of Blanchminster and Anglicus. The manor in Whitson, called Wadfast, temp. Edward III., belonged to L'Engleis or English. Temp. Edward I., Robert le Englysche, by his charter, gives to the priory of Montbourg with the assent of Julian his wife, and the Lord Roger Flandrensis, the land of La Slode, in the manor of Axemuth (Axemouth). Sir Robert Russell's name occurring as witness (lives of the Russell's). The family of English were of Stockley-English, county Devon; the heiress of the elder branch married Champernowne at an early period. (Lyson's Devon).

16. *Regium de Valletorta*, 51 knights' fees.

This is Reginald de Valletort, who succeeds to 51 out of the 59 fees held in 1165, by Ralph de Valletort. This return is made by Luke, son of Bernard, his steward, "*per litteras*" to the Barons of the Exchequer, 6th Richard I (1194). *Luca filius Bernardi* is a witness to Peverel's charter to Tywardreth priory.

17. *Robert de Cardinan*, 71 knights' fees.

This return is made by his seneschal or steward, 6 Richard I. In 1165, these 71 fees were held by Robert Fitz-William, whose daughter and heiress, Ysabella, became the wife of De Cardinan. Robert de Cardinan held two baronies in Cornwall, viz.—Cardinan and Botardel. He was living in 1216, but was dead in 1234. He was a great benefactor to the priory of Tywardreth, and at his request, Hamelin, the prior, fixed a weekly mass on Saturday, for his departed lady, Ysabella.

18. *Galfridus de Lacell*, who has half the fees which belonged to Richard de Lucy in this county—9 knights' fees as returned by Richard Fitz-William, his seneschal, 8th Richard I, 1197.

This is, doubtless, Geoffrey or Godfrey de Lucy, who, in 1189, was the successor of Toelive in the Bishopric of Winchester. He was son of chief justice, Richard de Lucy, and completed and greatly enlarged the priory of Lesnes, or Westwood, in Kent, which had been established by his father in 1178. In this priory, Richard subsequently assumed the habit of a canon-regular, and departing this life soon after, in 1179, was buried in the chapter house there. This beneficent prelate, Godfrey de Lucy, in the time of King John, had rebuilt the whole east end of the cathedral church of Winchester, with the Lady chapel, as far as that anciently extended; and at his death on 4th September, 1204, was buried under a tomb of grey marble, in the centre of his own works, opposite the entrance of the Lady chapel. On his death, in the 6th John, his sister's son, Robert Fitz-Walter, was admitted to the livery of such lands as descended to him from his uncle, Geoffrey, Bishop of Winchester, upon payment of 300 marks. This feudal lord, Robert Fitz-Walter, not many years after, in 1215, was appointed general of the baron's army, with the title of marshal of the army of God and the church, and under his command, they eventually extorted the Great Charters of Freedom from John, at Runnymede, a meadow by the Thames side not far from Staines.

MINERALOGY OF THE ROCKS LYING BETWEEN THE BLACK
HEAD AND PORTHALLOW, N.E. OF THE LIZARD DISTRICT.

By THOMAS CLARK, A.M.S.

To make more complete my paper on "Basal Wrecks and Remnants of Extinct Volcanoes on the S.W. Coast of Cornwall," published in the last Journal of this Society, I purpose referring, briefly, to the mineralogical composition of the rocks between the Black Head and Porthallow, but more particularly to such minerals as illustrate the passage of olivine, &c., into hornblendes. I select this portion of the district for investigation, because the mineralogical transitions or changes there are most recent, its rock-forming minerals are in a better state of preservation for examination, and such as the remainder of the district may be judged by; and, further, I shall endeavour to show that the Porthallow rocks closely resemble the rocks of other parts of the Lizard district.

To make clearer my researches, I have selected from a collection twenty-four slides, which I have presented to the Museum of the Institution. Twelve views from these are published with this paper, with particulars appended. Among them are specimens from the South of Coverack, Coverack, North of Coverack, Dean Point, Manacle Point, Porthoustock and Porthallow, illustrating first, where no perceptible change is visible in the rock-forming minerals; second, where the change commenced; third, in various stages of progress; and lastly, where not a vestige of the original forms are perceptible. Perhaps the most interesting and instructive are those where the change is about midway.

In working out the mineral structure of the rocks, in the before-mentioned district, I started with the southern-most land, and proceeded northward, passing along the brow of the tableland, from whence there is a sharp descent of about 300 ft. to the sea. Along the cliffs and the sharp declivities, the rocks are mostly bare of soil and vegetation, affording good opportunities for collecting specimens. For about two miles the mass of rock appears to consist of an almost horizontal sheet of Lherzolite, or a rock closely corresponding in

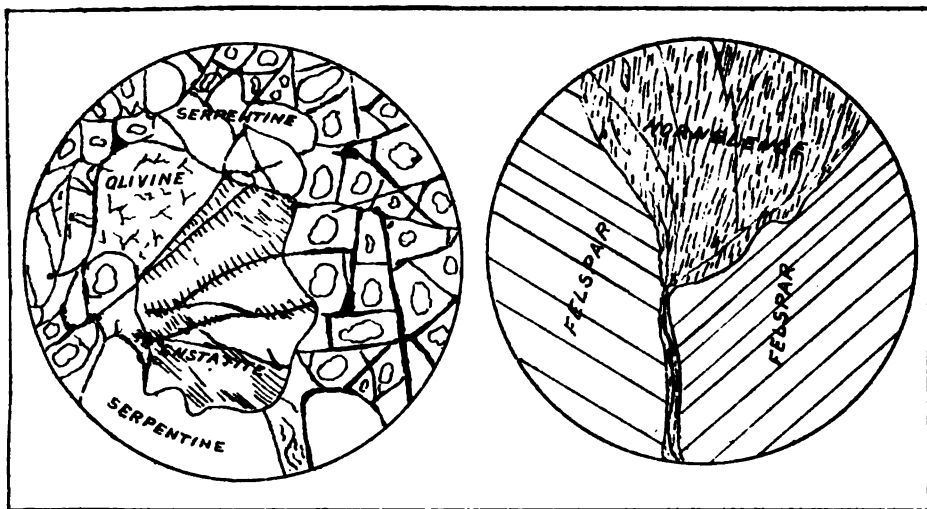


Fig. 1.

Fig. 2.

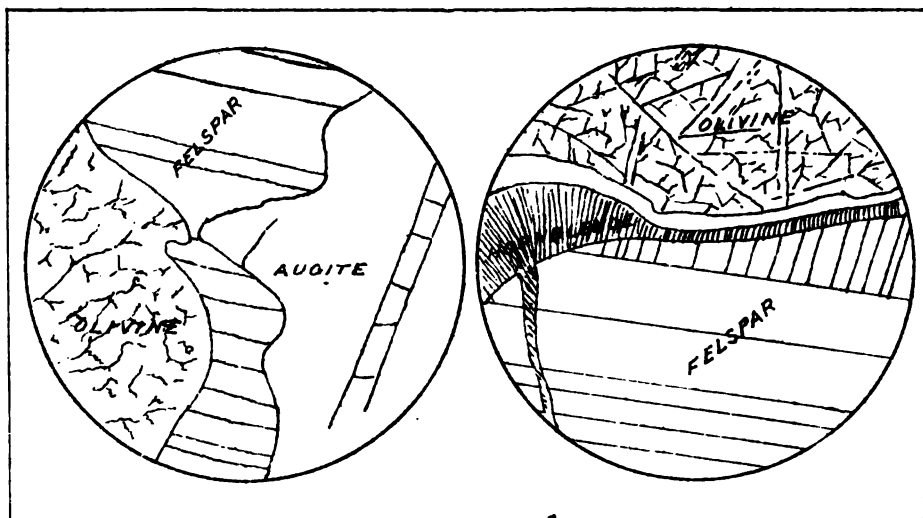


Fig. 3.

Fig. 4.



MINERALOGICAL STRUCTURE N.E. LIZARD DISTRICT.

Plate A.

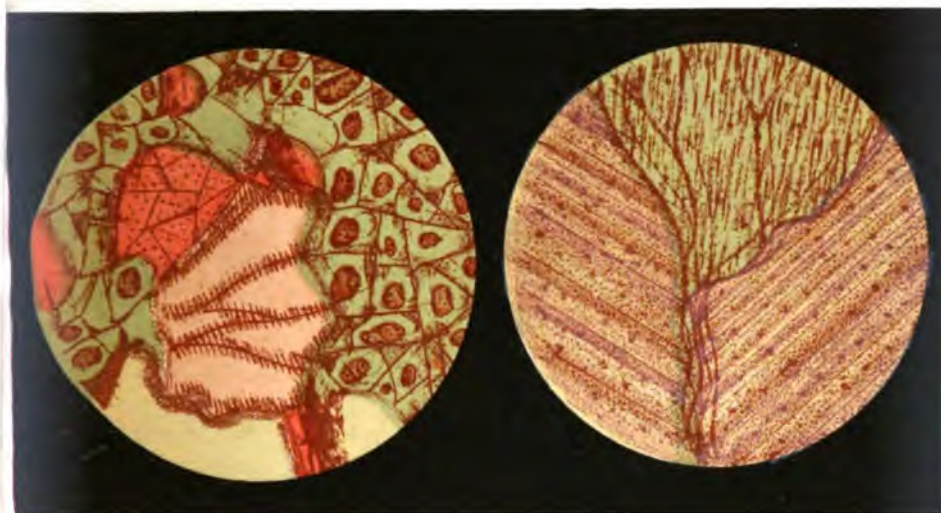
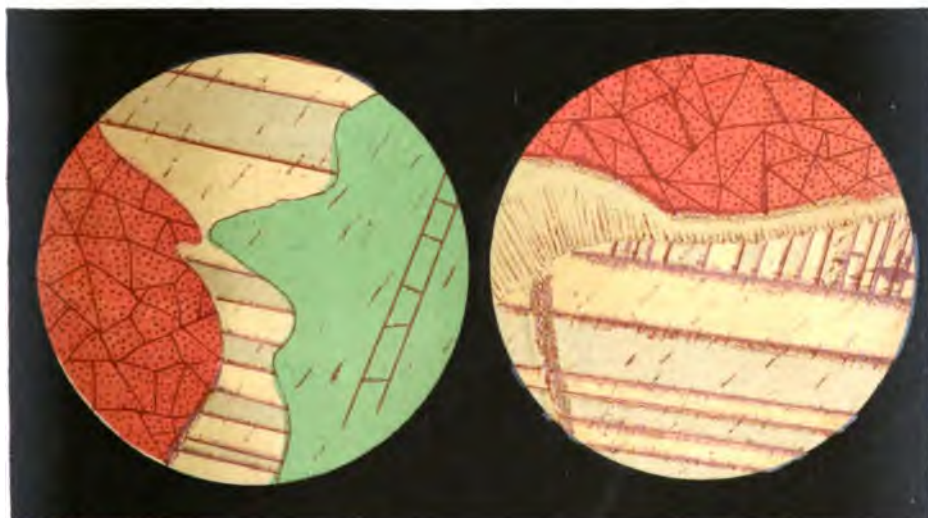


Fig. 1.—Enstatite and Olivine, Serpentine after Olivine. South of Coverack.

Fig. 2.—Felspar much altered, and Hornblende after Augite. Coverack.

Scale 20 diameters.

Polarised light.



Z. CLARK, A.M.S., THURGO.

LARK, LITING THURGO.

Fig. 3.—Augite, Felspar, and Olivine very fresh. Coverack.

Fig. 4.—Olivine and Felspar changing into Hornblende. Coverack.

mineral composition to it. Fig. 1 plate A, and fig. 10 plate C, illustrate the predominating minerals of the rocks to the south of Coverack. Here olivine and enstatite are in association, and both changing into serpentine, the former being darker, owing to its containing a higher percentage of iron.

At Coverack, the Lherzolite sheet makes a northerly dip, and is overlaid by alternate sheets of gabbro and serpentinous matter, with many of the original minerals yet unchanged. These sheets are pierced by small dykes of diorite and gabbro, and the whole again overlaid by the St. Keverne gabbro, which is probably the most recent formation of the region. The lower gabbro sheet near Coverack is much decomposed and disintegrated, and along its strike, water has excavated a valley; of this degraded gabbro I obtained a few kernels, to ascertain its constituent minerals. One of these (figure 2, plate A) I found to consist of felspar so far decomposed as to have lost nearly all power of polarization, and of augite changing into hornblende without attacking the felspar, as is the case with hornblende after olivine. In the same slide, beyond the field of view, are crystals of sphene and magnetite. The hornblende in this slide holds a somewhat analogous position in the felspar to the olivine and augite in plate B fig. 7, where the olivine has commenced to change into hornblende. General Mc Mahon, has recently given it as his opinion, that "hornblende is a secondary product after augite."* This expression, I believe, is founded on work done in the more southerly portion of the Lizard, where the rocks are older than the gabbro beneath the village of S. Keverne; the minerals, therefore, would be much more altered, having passed through stages where augite, at last, has succumbed to the solvents of the locality. In the gabbros, north of Coverack, I find the hornblende to be principally a product after olivine, as will be illustrated in detail.

The gabbro on which the church and village of St. Keverne stand, is the bed rock of several square miles of land. Here I could not successfully follow the line of section (marked in my former paper), on account of the land being in a forward state of cultivation, and was therefore driven to the cliffs, and quarries around the coast, from whence the best results are easiest obtained.

*Quart. Jour. Geo. Soc., 1889, page 523.

as will be seen from a careful study of the following. Fig. 3 plate A, from the brow of gabbro above the Coverack valley, shews augite, felspar and olivine associated, but very fresh, and without any perceptible symptoms of change. It was this slide that Prof. Judd stated corresponded with the Tertiary gabbro of the Western Islands of Scotland. Passing around the brow in a N.E. direction, I obtained the next specimen, from which two views are given (fig. 4 plate A, and fig. 5 plate B). Here felspar and olivine are found changing into anthophyllite, an acicular variety of hornblende. Anthophyllite is found pervading many of the rocks throughout the Lizard district, and is probably derived from similar passages as this. Continuing the route in a N.E. direction, I obtained the specimen illustrated in fig. 6 plate B, which is full of interest, inasmuch as where the olivine and felspar are in contact the changes into hornblende and marmolite are advancing, as is seen by the broken line of junction, but where felspar and augite, or olivine and augite, are in contact, there is no change to be discerned, the crystalline surfaces being most distinct.

At Dean Point I obtained the unique specimen, fig. 7 plate B, where a crystal of olivine is held, as if in a vase, by augite, and both of these minerals are surrounded by felspar. Where the felspar comes in contact with the olivine the latter has the appearance of matter in a state of effervescence; but where olivine comes in contact with augite, the olivine is shielded and protected from corrosion by the augite, as gold or tin protects the baser metals. This is invariably the case, and hence my opinion that the hornblende of this locality is to a great extent derived from olivine.

At Godrevy Cove denudation appears to have been assisted, judging from the peculiarities of the positions of the higher and lower rocks, for I find the junction of two sheets of unequal ages, in anticlinal positions; the ridge has given way and a lower and softer rock has been reached, which forms the bed of a water shed, and reveals the sheets of gabbro on either side of the valley. This outcrop of altered clay-slate, may be seen at about half tide mark on the beach, and is pierced with a network of small veins and dykes of gabbro; this position I consider a favorable one from which to calculate the thickness of the basic rocks of the Lizard, which I estimate not to exceed 600 feet.

The Manacle Point is now reached, where the older sheets are in bold relief, and are of equal interest to any portion of the Lizard district. These extend, northward, from Godrevy Cove to Porthoustock Creek, over $\frac{1}{2}$ -mile in breadth; eastward, far out into the sea (the dreaded Manacle rocks); westward, from the point inland more than 2-miles: in the latter direction it has a dyke-like appearance, but careful views on the field and with the microscope proves it to be the remnant of a sheet of more ancient production than its neighbour, and yet at an earlier date it no doubt resembled the gabbro that now fills the basin S.W. of it. Its principal rock-forming minerals are, sphene, magnetite, labradorite, and horn-blendes after augite and olivine: some of its slides correspond with those from the kernals of gabbro at Coverack, and probably are of the same age. Some of the felspars are almost glassy clear, and in polarized light show grand striation and colours; others are much changed and opaque. Fig. 8 plate B, a section from a quarry at the head of Porthoustock creek, is the brightest I have obtained from this sheet: the great majority of its minerals show indication of age.

The banded rocks lying between Porthoustock and Porthallow consist of matter closely resembling that within the Manacle basin from which it undoubtedly overflowed, and, by more rapid chilling, formed its walls; this again rests nonconformably on the upturned edges of the lower silurian clay slate.* These banded rocks contain a high percentage of the following minerals:—hornblende, augite and felspar, serpentinous bands after olivine, enstatite, etc., with some portions of their minerals yet unchanged. In some cases the enstatites are found changing into schiller-spar, bastite and talc, the augites into hornblendes, and the labradorite and other felspars into saussurite. &c. At the junction of the banded and non-banded rock at Porthoustock, there is what appears to be a small dyke, composed principally of malacolite and felspar, and similar dykes penetrate the banded rock throughout.

The average specific gravity of the Porthallow stone is 2.984, and that of the Manacle point, 2.964, there being only a difference of 20-oz. to the cubic foot. The sample of rock I tested from the point was a surface one, and that of Porthallow, from the bottom of

*See map and section in No. 85 Journal Royal Institution of Cornwall.

the quarry, about 50-feet from surface. I think that had each been obtained from similar depths, they would have been of nearly equal specific gravity. Further, the sheet and banded matter compare very favourably with my road metalling test in hardness and tenacity, but under the microscope I have not yet discovered in the banded rocks a single felspar retaining its original form or brilliancy. All appear fragmentary and opaque, but showing evidence of being equally as ready to give place to hornblende as their more brilliant and perfectly formed neighbours in the adjoining gabbros. Augite, enstatite, and olivine are found in a little better state of preservation, but these, too, are giving place to new forms.

Fig. 9 plate A, from Porthallow, shews serpentine after olivine, and also contains a crystal of enstatite partially changed into serpentine. Where the change has taken place it has the appearance of matter as if it had been held in solution, but there is no evidence that a solution had passed along a fault or fissure, as the fibres of enstatite shew neither curvature nor breakage. From Shepherd's quarry, was taken the beautiful specimen of malacolite shewn in fig. 11 plate C; it is changing into dark green hornblende, and is associated with saussurite and actinolite.

At Porthallow, from a grey band associated with serpentine, was obtained the specimen shewn in plate C fig. 12, which consists principally of hornblende and asbestos. It has the most perfect anthophyllite crystals that I have yet seen, which were doubtless derived from a similar change to those in the gabbro of St. Keverne.

In 1886 I first noticed malacolite, or colourless augite, near Kynance Cove, Porthoustock, and Porthallow, and about two years ago Mr. Teale recorded his discovery of it at Karakleus,* since which Gen. Mc. Mahon has also found it, as he says, unexpectedly, at Penvoose, and remarks that, in certain sections, "Malacolite may be seen, in thin slices, in every stage of conversion into hornblende."† The finding of this igneous mineral in these different localities, is, I think, sufficient to certify its presence in the whole of the Lizard district, and, taken in conjunction with Prof. Judd's

*Journal of the Mineralogical Society, No. 37, 1888.

†Quar. Jour. Geo. Soc., 1889, page 524.

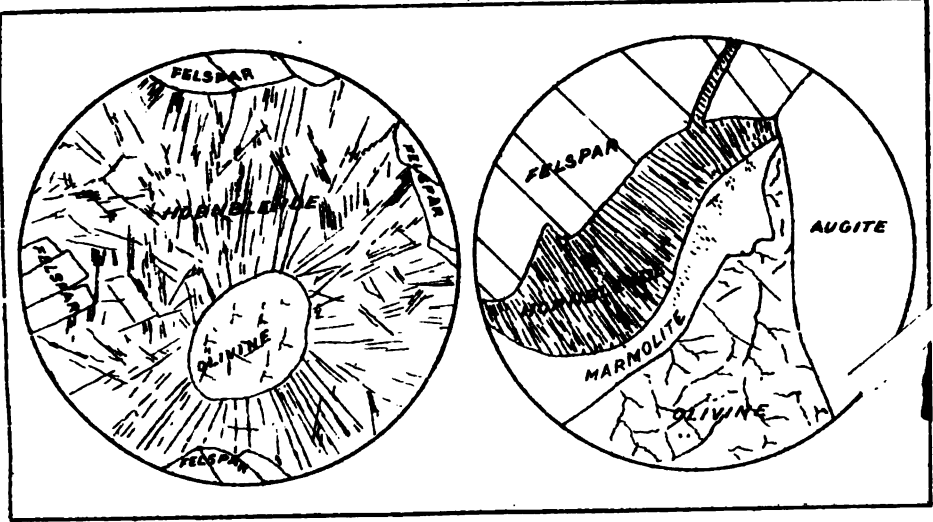


Fig. 5.

Fig. 6.

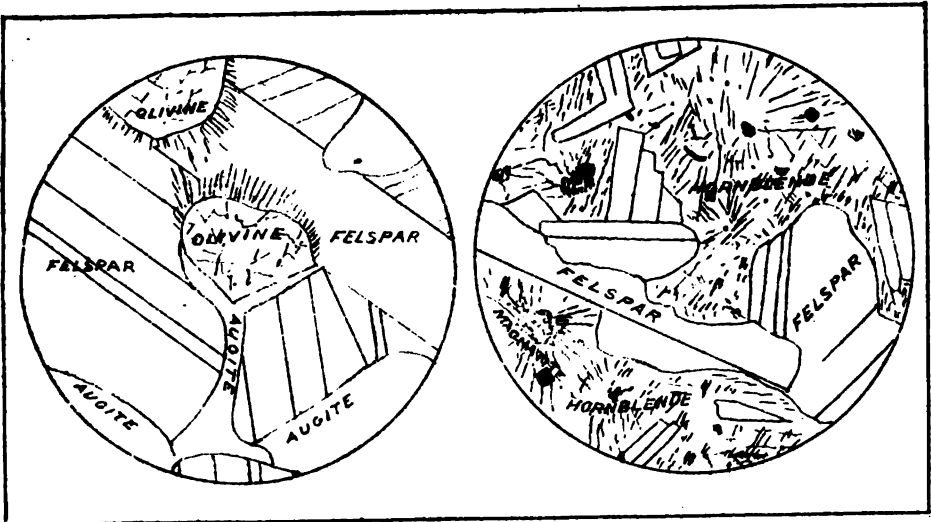


Fig. 7.

Fig. 8.

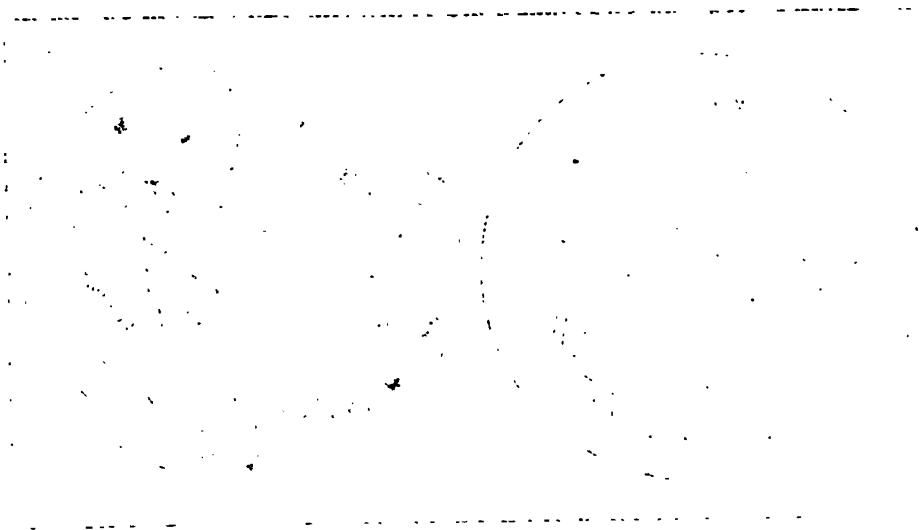
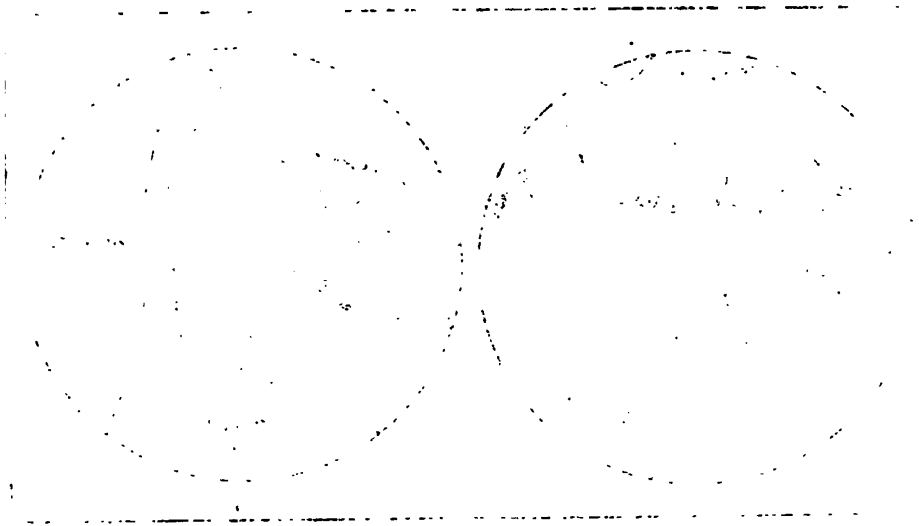




Fig. 5.—Olivine and Felspar far advanced into the Hornblendic change.. Coverack.

Fig. 6.—Felspar and Olivine changing into Hornblende: Augite unchanged. Coverack.

Scale 20 diameters.

Polarised light.

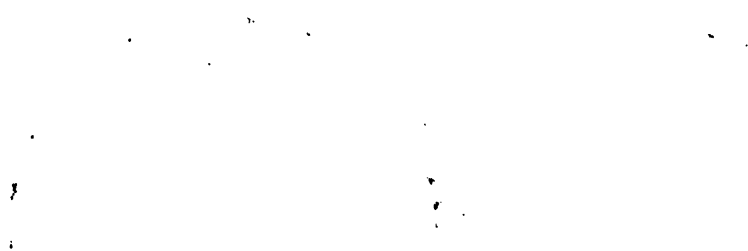


T. CLARK, A.M.S., TORONTO.

CLARK, LITHO. TORONTO.

Fig. 7.—Crystal of Olivine partially surrounded by Augite and by Felspar. Dean Point.

Fig. 8.—Felspar and radiated Hornblende, with Magnetite. Manacle Point.



opinion that "the gabbros of Coverack closely resemble the Tertiary gabbros of the Western Islands of Scotland," is a very important feature in working out the volcanic origin of the Lizard rocks.

Prof. Bonney has admitted that he examined the district at an unfortunate epoch, and had consequently fallen into one error, viz., among the banded series occurred porphyritic felspar, which he now knows is usually indicative of igneous origin, and had overlooked several masses which he would now be inclined to regard as igneous.*

The banded and foliated appearance of the hornblendic schists of this locality I attribute to the varying composition of the materials supplied to the crater, not an uncommon thing in volcanic ejectments. A similar banded appearance is recorded of the lapilli covering Pompeii, which may be attributed in that case to the material of the highest specific gravity—in its passage through the atmosphere—first reaching its resting place. The same is also recorded of the obsidians of Hungary and the Lipari Islands, and I find, on examination, the felspathic tufa from the Kathkin hills, near Glasgow, also shows a banded appearance, resembling that of the Porthallow rocks.

The outcrop of the Manacle sheet, with the great variations of its predominant minerals in so short a distance, impels me to the conclusion that this was the source from which the banded structure lying between Porthoustock and Porthallow flowed,† and were the same mass in motion to-day, no other result could be obtained.

In proof of its volcanic origin in contra distinction to plutonic production or contact metamorphism, I submit the following:

1. The lower beds or sheets contain traces of matter that has passed through many changes since its first selective process, at high temperature, into rock-forming minerals, and sheet by sheet as we ascend newer and fresher fire-formed minerals appear, until we arrive at a point where no perceptible change through age is traceable; all are clear and bright as of recent finish.

2. Had such minerals been of plutonic origin the most perfect crystals would be found in the lowest beds.

*Quar. Jour. Geo. Soc., Lon., 1889, page 543.

†See Map in No. 35 Journal, B.I.C., Oct., 1889, and Microscopic section.

3. Had they been the product of contact metamorphism, such a grand series of crystalline rocks would only be found in close proximity to necks and dykes, and even then olivine would be wanting.

In conclusion, I think I have proved that the rocks lying between the Black Head and Porthallow, the N.E. of the Lizard district, are composed entirely of volcanic or igneous minerals, and are now passing through the phases that such matter is found to undergo in other regions.

The "Problem of the Lizard Rocks," which has proved a complicated one to many a savant, is, in my opinion, now solved, and I feel sure that all further investigation by those who are really interested, will confirm it.

The following is an explanatory list of the slides presented to the Museum, where they can be studied.

- Slide 1.—From South of Coverack.—(plate A fig. 1)—Enstatite, olivine, and serpentine after olivine, and enstatite showing symptoms of change.
- Slide 2.—From South of Coverack, consisting principally of olivine and enstatite in their characteristic changes into serpentine.
- Slide 3.—From a gabbro, N. of Coverack.—(plate A fig. 3)—Consisting of augite, felspar and olivine, very fresh, without any perceptible change in the mineral. This was the slide seen by Prof. Judd.
- Slide 4.—From N. of Coverack.—(plate A fig. 4)—Olivine and felspar in contact, and their change into hornblende advancing.
- Slide 4a.—From N. of Coverack.—(plate B fig. 5)—A kernel of olivine surrounded by hornblende, in contact with felspar, illustrating the general change of the mineral in this region.
- Slide 5.—From N. Coverack.—(plate B fig. 6)—Shows the mutual relation that exists between olivine and augite; here no dissolution appears, but where olivine and felspar have been in contact, antagonism has been at work, and out of their wreckage new-formed hornblende has appeared.
- Slide 6.—From Near Dean Point.—(plate B fig. 7)—A small piece of olivine, as if in a vase of augite. A unique specimen, in the problem of the passage of the various minerals into hornblende.
- Slide 7.—From Coverack.—Contains both old and new minerals. In the old rock is found olivine, enstatite, and anorthite; the latter mineral is much changed, but sufficient lines of the original

twinning is visible to identify it. In the dyke is fresh augite and enstatite, and again the whole is fractured, and the fissure filled with beautiful marmolite.

Slide 8.—From Coverack.—Part of a kernel of decomposed gabbro, consisting of felspar, hornblende, diallage, sphene, and magnetic iron.

Slide 9.—From Coverack, consisting of old serpentine with new-formed dyke of augite and enstatite, very brilliant under polarized light; also, some veins of marmolite, passing through enstatite.

Slide 10.—From Coverack.—(plate A fig. 2)—Kernel of altered gabbro, with felspar much changed, augite far advanced into hornblende, and some good crystals of sphene, and much magnetic iron.

Slide 11.—From a small dyke at Coverack.—Consisting principally of labradorite, sphene, and some small grains of olivine.

Slide 12.—From Coverack.—(plate C fig. 10)—Olivine and enstatite, each changing into serpentine; the difference in the two serpentines is most interesting, the olivine serpentine contains more iron, and is much darker than the enstatite serpentine; of frequent occurrence.

Slide 13.—From Manacle point.—Containing augite and felspar, much altered but not broken.

Slide 14.—From a quarry by the road-side, at the head of Porthoustock creek.—(plate B fig. 8)—Contains some clear crystals of felspar and radiated hornblende, similar to those surrounding kernels of olivine further south; where it comes in contact with felspar, the latter mineral is deformed or wasted; actinolite too, is present, and some well-preserved crystals of magnetite.

Slide 15.—From Porthallow.—A serpentine rock after olivine and enstatite changed into talc, bastite, and much iron; it also contains some good veins of marmolite.

Slide 16.—From Porthallow.—A banded serpentine, with kernels of olivine and enstatite yet unchanged.

Slide 17.—From Porthallow.—Containing fragments of opaque felspar, and anthophyllite.

Slide 18.—From Porthallow.—A banded serpentine, apparently after olivine and enstatite.

Slide 19.—From Porthallow.—(plate C fig. 9)—A serpentine containing a crystal of enstatite only partly changed into serpentine; where the change has taken place, it appears as if it were a solution, but there is no evidence that the solution has passed along a fault or fissure; the fibres of the enstatite show no evidence of curvature or breakage.

- Slide 20.—From Porthallow.—With alternate bands of serpentine and anthophyllite.
- Slide 21.—From Porthallow.—A good specimen of anthophyllite from banded rock.
- Slide 22.—From Porthallow.—Containing bands of saussurite-felspar and augite, changing into anthophyllite.
- Slide 23.—From Porthallow.—(plate C fig. 12)—Consisting principally of well-developed crystals of anthophyllite and asbestos.
- Slide 24.—From Shepherd's quarry, Porthallow.—(plate C fig. 11)—Malacolite changing into a dark green hornblende, associated with saussurite and actinolite.

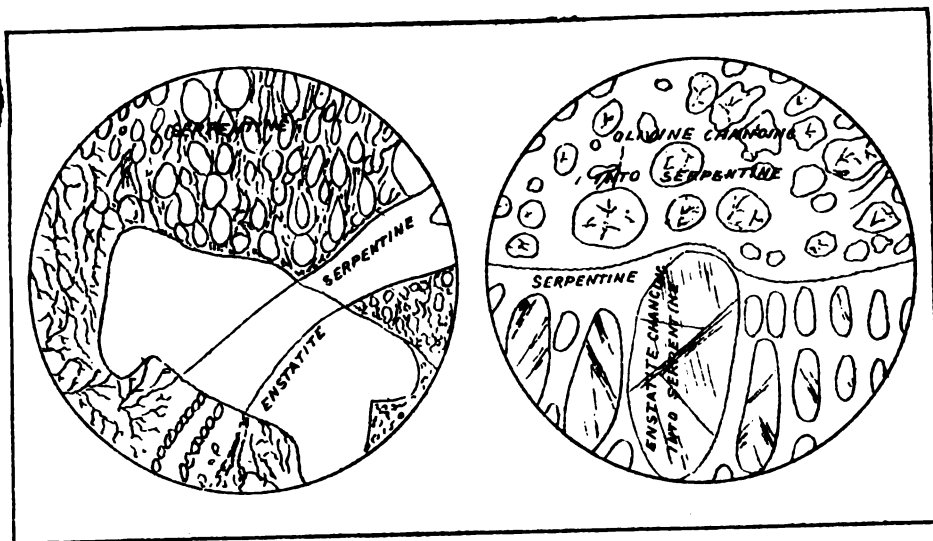


Fig. 9.

Fig. 10.

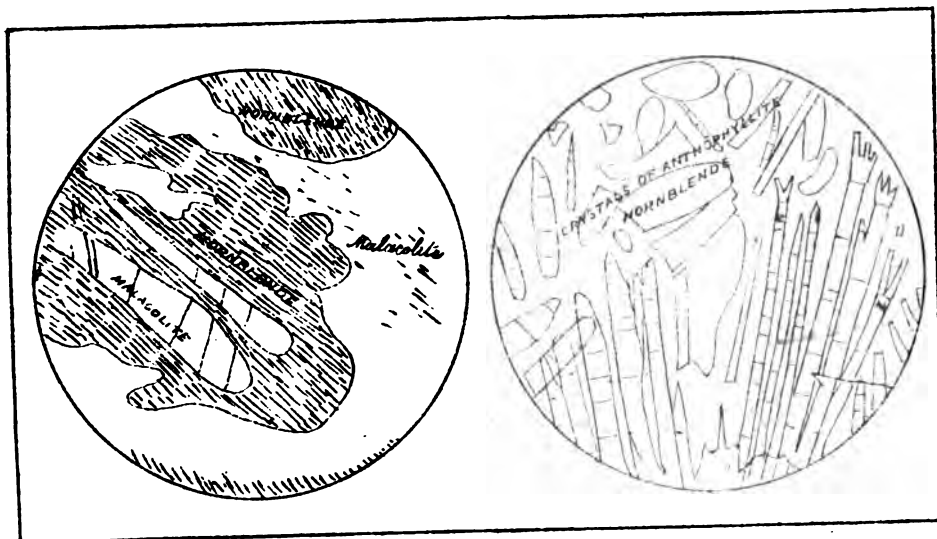
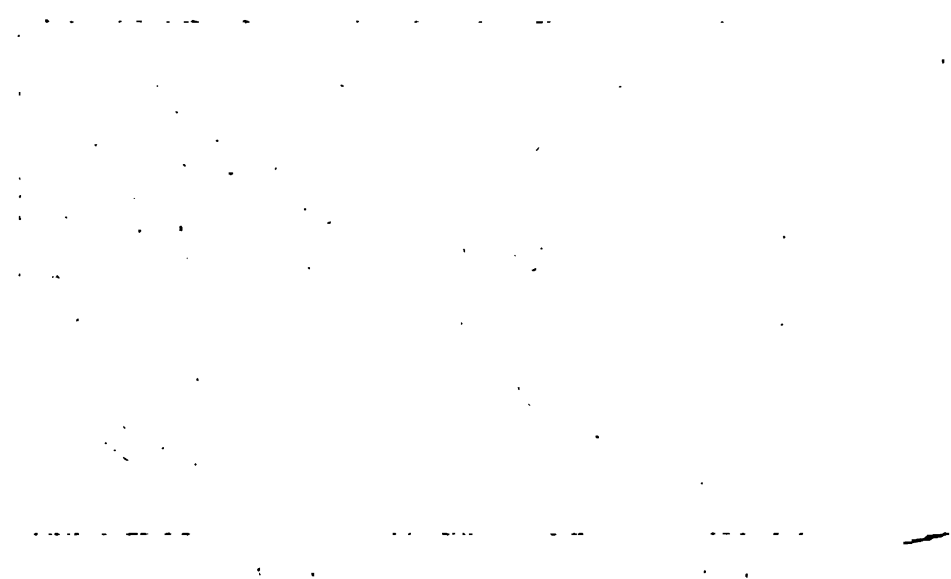
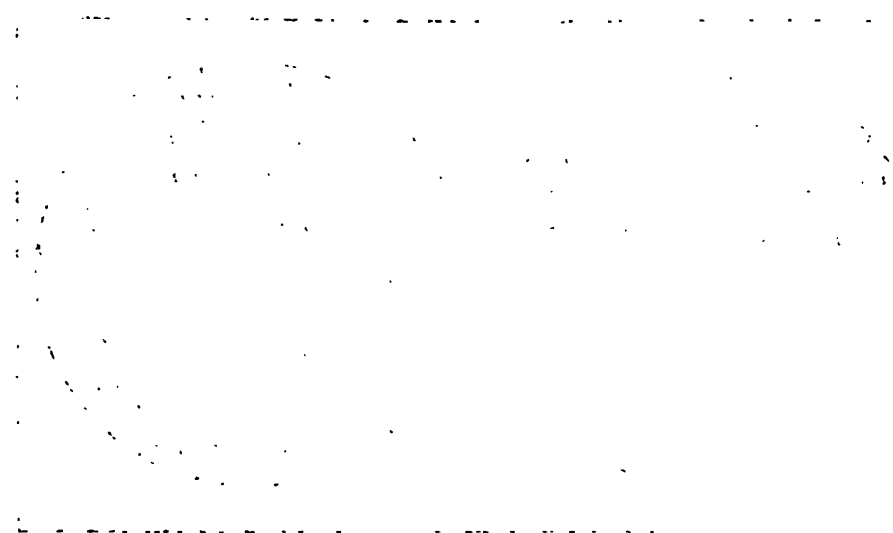


Fig. 11.

Fig. 12.



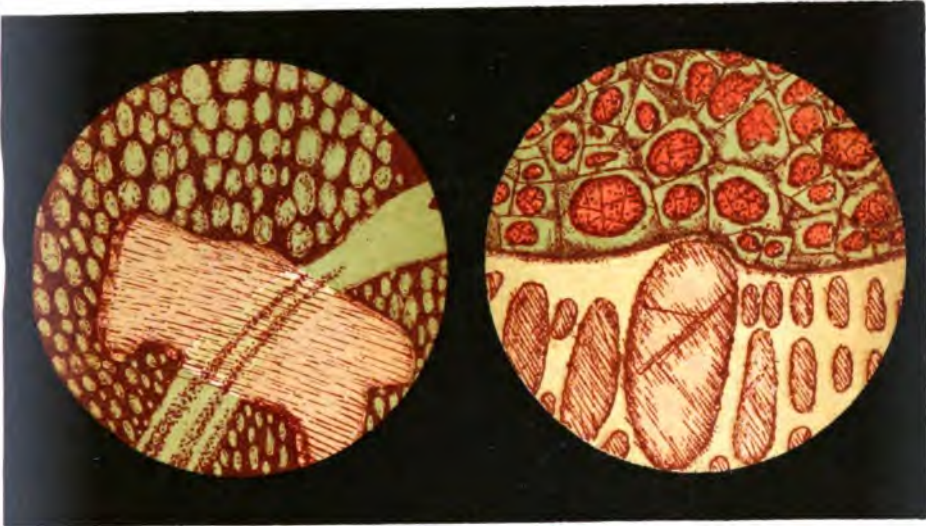


Fig. 9.—Enstatite and Serpentine, fibres of Enstatite unchanged. Porthallow.

Fig. 10.—Olivine and Enstatite each changing into Serpentine. Coverack.

Scale 30 diameters.

Polarised light.



F. CLARK, A.M.S., TRURO.

LAKE, LITHO TRURO.

Fig. 11.—Malacolite changing into dark green Hornblende. Shepherd's Quarry, Porthallow.

Fig. 12.—Banded rocks containing well-developed Anthophyllite crystals. Porthallow.

ON SOME RECENT ARCHÆOLOGICAL DISCOVERIES IN
CORNWALL (ROCK-MARKINGS, CINERARY-URNS, CELTIC,
ROMAN, SAXON, NORMAN, & MEDIEVAL REMAINS).

By REV. W. IAGO, B.A. (Hon. Local Secretary for Cornwall of the Society of
Antiquaries, London; &c.)

Cornubia, Cornugallia, Cornwallia,* with its rocky islets and bold promontories, having been the first land sighted across the sea by voyagers who sallied forth from between the Pillars of Hercules and sailed northward past the western shores and isles of the great continent of the old world, might reasonably be expected to afford evidences, in the present day, of having been visited in various ages by the representatives of many nationalities,—and this it does.

Relics, of various kinds, links in the chain of history, abound throughout its sea-girt area, and elucidate to some extent the modes of thought and the habits which have prevailed during many an epoch.

With hosts of such relics in Cornwall most readers and observers are familiar, but each successive year reveals something fresh, connected with the past, and throws additional light upon earlier discoveries which in some instances have been but partially understood.

Since the communication of my first paper to the Journal of the Royal Institution of Cornwall twenty years ago, it has been my pleasant privilege as an archæologist to report, from time to time, to my fellow members of the Institution, at their various meetings, several antiquarian "finds." Many of these have not been fully recorded, they have been mentioned and then reserved for illustration in the Journal.

Materials for several papers having thus accumulated, my object now will be to give a summary of particulars relating to a few of the subjects, instead of devoting to each of them a lengthy description in separate form.

This summary will introduce them as far as possible in the order of their archæological sequence:—

*For notices of the Carnabii, Cimbri, and Dumnonii,—of the Cernewec or Kernuac, Cornish,—and of Kernow, Cornwall, or West Wales, see the various local histories.

(I). ROCK MARKINGS.

Marks artificially produced, some of them being evidently archaic, have been found upon the rocks of Cornwall. Their age is unknown.

Before describing them I would observe that it was formerly the custom with antiquaries to regard as the work of man much that had been effected by inanimate nature.*

It was so with the ponderous masses of rock forming the Cornish and other Tors.

Any appearance of fantastic grouping or mysterious piling of blocks, any remarkable shapes assumed by boulders, any well-defined concavities on the upper surfaces of exposed rocks, were declared to be Druidic, if not Titanic, in their origin.

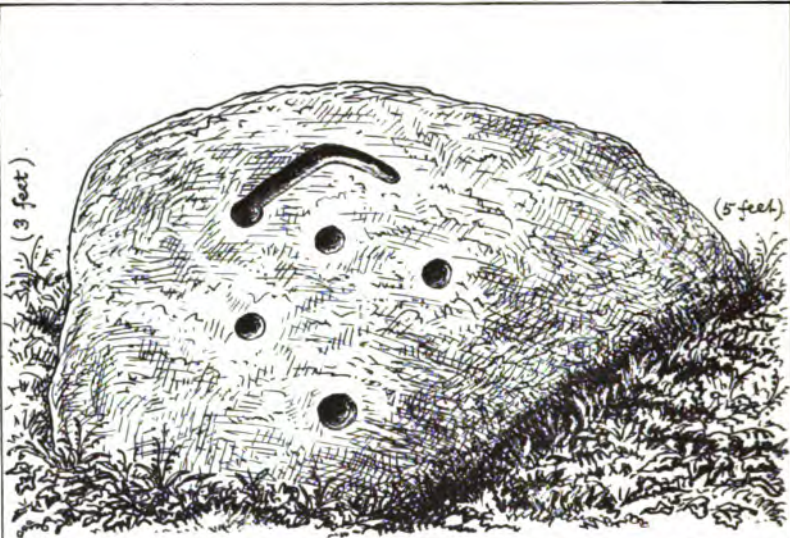
The eroding action of carbonic acid contained in rain falling upon granite, and the abrading effect of the oscillation of rain-water lodged in depressions of the stone and agitated by the wind, were not taken into calculation; but such action, brought to bear upon surfaces and upon their slight inequalities, though at first it may be imperceptible, produces very visible effect when the contact has been continued through untold ages. This fact being now recognized, antiquaries have ceased to suppose that the formation of natural rock-basins hollowed out by exposure to the weather during countless centuries, the poisoning of rocking or logging stones, known as logan-rocks, the dividing and settling of various other blocks in strange positions, parted from their original adjuncts by disintegrating agency, were produced "by art and man's device,"—the revelations of Geology and Chemistry having corrected so erroneous a view.

There are of course certain rocks in Cornwall which have been tooled, not only where miners and quarry-men, of old, have been at work, but also where ancient strong-holds have been constructed.

Scarped rocks and dykes are met with, also ramparts composed of rocky fragments piled up for defence.

Nor can it be denied that human labor may have been employed to render more shapely some rock-idol, if indeed such

*See Borlase's "Antiquities," 1st edition, 1754, Book III.



Sketch of Blight's view of the marks upon a Granite Rock on the Down at Goldherring, Sancreed; beside track leading to an ancient Camp. Near the rock are British Huts, and about 100 yards off was a stone grave containing Urn, ashes, &c. Diameter of Cups or pits, 2 to 3 inches.

(15 in.
long,
1 ft wide,
9 in.
thick.)



Upper and under surfaces of a stone found near Bodmin; veined with quartz. Cups or pits have been formed by pounding Ore, or by grinding. Diameter of pits 2½, 3, and 5 inches. Similar stones have been found in other parts of Cornwall.

— (Scale $\frac{3}{4}$ in. to foot.) —

Artificial Depressions in Unhewn Stone. Cornwall.

existed anywhere in this western land, as has been supposed, —but, with regard to this, the conjectured instances* pointed out in Cornwall and Scilly, although curious are not of a convincing kind.

Some writers have surmised, and ingeniously† argued, that theories connected with the productiveness of the earth and the renewal or regeneration of human nature were associated with menhirs, stone circles, groups of rock such as formed a dol-mên, and the cutting through of such stones as the mên-an-tol. This last has a well-known ceremony attaching to it for the recovery of pristine health, which has been cited in support of this view of its superstitious use. Respecting this same relic, others have conjectured that it had an astronomical origin, whilst others, again, have supposed that it was sepulchral.

To account for holed-stones,‡ the tethering to them of victims for sacrifice has also been suggested, and some have thought that rock-basons were used for the reception of sacrificial blood.

We cannot however dwell further on these surmises.

Perforations made in upright stones riven from their native beds, can scarcely be classed with Rock-markings, except in so far as the stones may be regarded as rude fragments of rock belonging to a remote era, but they introduce us to the consideration of incised rock-marks in general, and the fact remains that the apparently oldest stone incisions traceable in Cornwall are circular in form.

Prehistoric rock-marks of any kind are very rare in Cornwall, although circles, pillars, cromlechs, and cist-vaens, are numerous, also Inscribed stones§ belonging to a later period.

In the north of Great Britain and also abroad rock-marks abound,|| they include single rings and concentric circles, with or without a central pit or dot, certain curved and other lines, &c., also simple cup-marks not encircled.

*Borlase's "Antiquities," plate ix, and page 165.

†Phallic remains, 1889, pp. 68, 74, 76.

‡Twelve of them are given in Lukis's Prehistoric Monuments of Cornwall, Plates xxxiii, xxxiv.

§Their incisions consist of some or all of the following :—letters (but no oghams); crosses, scrolls, and interlaced work; various other symbolic figures and ornaments.

||See Tate, Simpson, &c.; and Lubbock's Prehistoric Times, pp. 159—161

For a long time it was thought that Cornwall contained no such markings.

Certain hard, rough, irregular stones, of handy size, but of no particular shape* have been found in various parts of the county, displaying on all their sides, pits, or hollows, circular or nearly so, of cupped form, which do not appear to have been cut, but to have been caused by the pounding upon them of ore, or perhaps corn, with a smaller stone used as a pestle.

One such rude muller, or tin-stone crusher, has been found near Bodmin, where it now is, in Mr. Dennis's possession. On its varied surfaces are many pits made smooth by a beater or grinder.

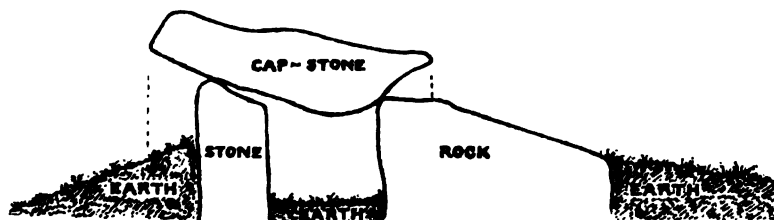
Another stone, very much like it, has lately been placed in the Museum at Truro, and there are several in the Museum at Penzance. Nothing is known as to when such stones ceased to be used.

The late Rev. Dr. Borlase sketched one of two tall stones which he noticed, in 1753, standing near each other. It was marked with incisions which he could not decipher.† His descendant Mr. W. C. Borlase kindly sent me a fac-simile of the drawing, together with descriptive notes from the Borlase manuscripts, in the hope that the monument might prove to be cup-marked.

From the notes and copy of the drawing, I gather that the stone stood about 7-ft. 3-in. above ground, and was 2-ft. 6-in. wide at base. It was situate, according to Dr. Borlase, "about a mile west of Camelford, in the high road," "adjoining to a gateway on the right hand side as you come on to Wadebridge." It was one of "two very large stones said to be landmarks or bounds of fields," and he added:—"Probably the inscribed stone stood at one end of the grave, and that by it, alike in shape and size, at the other end."

*Stone mullers more elaborately formed, circular within, and sometimes externally square in plan—having the appearance of bowls of Norman design,—are plentiful throughout Cornwall, and are often mistaken for fonts or stoups. These, of course, do not belong to the rock-mark period.

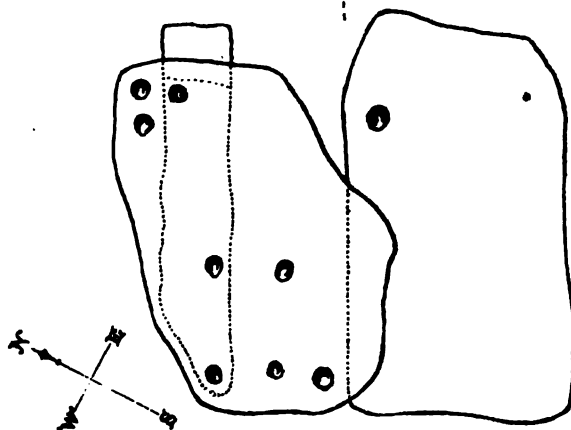
†Borlase MSS. Inscriptions, p. 89.



(Section).



(Plan).



Quap-marks discovered on the Cromlech by Rev. W. L. India, M.A.
R.S.A. and Mr. W. L. Berlioz, M.A. R.S.A. on 11th of August 1879. @@@@.

9 Cups { 8, on Capsterns, 4 to 8 inches in diameter, $\frac{1}{2}$ to $1\frac{1}{2}$ inches deep.
1, on Rock, 6 inches — " — " — $1\frac{1}{2}$ inches — " — " — }

See "Prehistoric Stone Monuments (Cornwall) 1925," See "Antiq. London," pp. 10, 20. Pl. XXII.

A recent search for these stones has proved unsuccessful, and a suspicion now strikes me that perhaps the incised one may be identical with the Castle Goff "Sybstel,"* erected a few years ago on Lanteglos Rectory lawn, where it now stands. Judging by Dr. Borlase's sketch, its general appearance is very similar, its height, its former distance and direction from Camelford also agree, but the width across the base differs by a foot. The identity therefore not being quite established, a further search should be made, especially as an intimation has reached me, through Mr. Tellam, of Bodmin, that an inscribed stone hitherto undeciphered exists somewhere in the same district.

Curious marks were noticed some years ago by Mr. H. Michell Whitley "on a stone under a thorn tree, on what seems to be the site of a walled barrow, about 100 yards north of Carwynen Cromlech," near Pendarves, Camborne. He thought that they might be artificial, and like those on the Macroom Cromlech in Ireland. He forwarded to me figures of the markings on both, but considered that further investigation was needed before he could offer a definite opinion with regard to them. We therefore leave them to him for elucidation.

Reference must next be made to some marks discovered by Mr. Blight upon a rock on Goldherring Down, in Sancreed, near Penzance.† He figured and described them as "5 cups, varying from 2 to 3 inches in diameter, with a curved line over them." He states that they are near the sites of ancient dwellings and sepulchral remains, and informs me that they are rounded pits, semi-circular in section.

Since he discovered them they have engaged the attention of other antiquaries.

It has been alleged further that marks, supposed to be cup-markings, have been found near the Cheese wring, in the Liskeard district, the late Mr. Henwood, F.R.S., having pointed them out for examination.

*Maclean's "Trigg Minor," Vol. 2, page 281, plate xxxiv, in which I have figured it.

†Transac. Penzance Nat. Hist. and Antiq. Soc., III, 67, 1865; R. I. of C. Journal, Vol. 1, No. 4, Oct. '65, p. xvii., Vol. 2, No. 6, Oct. '66, p. ix.; Soc. of Antiquaries Proceedings, III, 302, 1866, with illustration.

But now I must proceed to describe some very distinct rock-markings found in the neighbourhood of Newquay, on the north coast of Cornwall.

Col. Michell some time ago directed attention to them, and Mr. Henry J. Martyn recently took me to see them; some of them are inaccessible, the others probably can be reached best by climbing up the rocks from a boat, the steep descent to them by land being highly dangerous.

These rock-markings are numerous, most of them are on the northern shore of the Gannel, exactly opposite Crantock, which is on the other side of the water. Ancient mounds appear on the heights immediately above them.

The cuttings are shaped either as incised plain broad flat rings, or as round flat-bottomed hollows, more or less deep. I did not observe central dots, nor any concentric or other lines.

The plain broad rings are similar to those of Scotland shewn in figure 5, at page xvii of No. iv, Vol. I. of this Journal. Dr. Simpson, of Edinburgh, wrote with regard to such marks that they varied from a few inches to 3-feet across.

The rings and hollows near Newquay are about from 15 to 20 inches in diameter.

On some of the rocks, only one or two of them appear, whilst not far off a group of about 30 or 40 may be seen, some separate from the rest, but most of them in a confused and overlapping cluster.

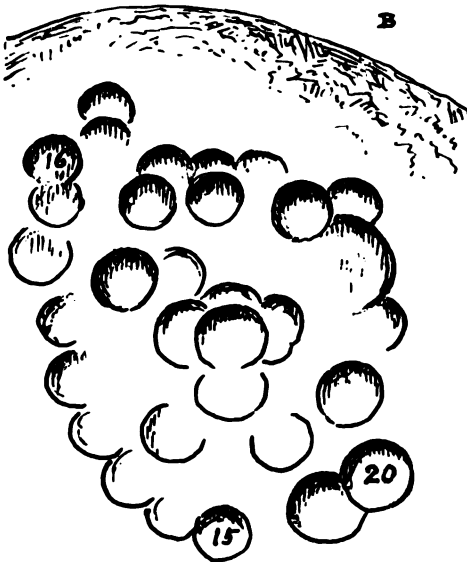
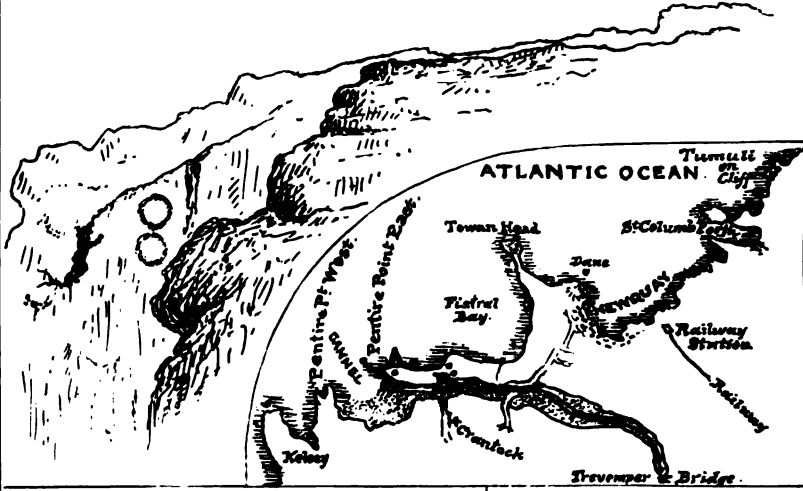
It is much to be desired that a clue should be found to their age and purpose.

Some regard them as prehistoric, others as modern. Natives and those long resident in the locality (including the oldest man, who has been engaged from his youth in navigating the Gannel), state that they have existed from time immemorial.

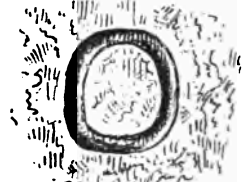
It may tend to a solution of the mystery, if I describe their position and character more in detail, and quote the theories propounded to account for their formation:—

The Gannel is a wide estuary filled with sand through which runs a river, and along which the tide ebbs and flows.

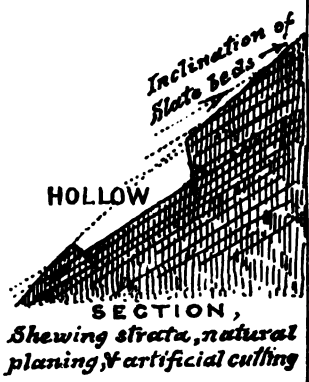
Precipices at A.



Group of pits or hollows on sloping Rock on shore of Gannet, at B, in the map. Figures signify diameter in inches.



Annular but not Circular, in some instances.



W. IAGO.

Rock-marks near Newquay.

The headlands between which it lies are called East and West Pentire,* these jut out boldly into the Atlantic. The base of East Pentire is formed of slaty rock, the beds of which dip or are inclined at a considerable angle. Around the point the rocks are very precipitous and much broken. Tumuli, as already mentioned, occupy the summit and ridge. In a sort of gap formed by the inroads of the sea on the Newquay side of this point, 2 or 3 rings can be dimly seen, they are near the top, on the face of a lofty sheer precipice of rock in an inaccessible position. The sea dashes in with great force below. The rings have a somewhat western aspect.

On the southern or Gannel side of the same headland (East Pentire), the ground presents a steep declivity to the rocks and water beneath. On those rocks, forming the north shore of the Gannel, the majority of the marks occur, they have a south or south-westerly aspect.

The rocks are of rugged slate; hard, rough, and presenting jagged points very difficult to climb. Most of the marks are cut upon the slate beds where the stratified rock has not shifted its position, but others are found on slabs which have flaked off and slipped down a little way towards the water running beneath. Such cleavage may have taken place since the marks were cut.

The marks are incised perpendicularly to the strata, *i.e.*, nearly at right angles to the sloping face of the weather-worn rocks.

In the accompanying plan, A and B indicate the localities in which the marks occur. The other diagram shews their form.

Those marks which are merely broad rings, retain their central disc of stone, but from the cuttings which are hollows, the core or central portion of stone has been taken. The circumference of each pit is formed by a sharply cut line which in some cases goes down deeper than the portion of core which has been removed. It is circled into the rock, and in each instance the core has been split off in conformity with the strata. The surface of the rock however, having been by natural causes planed down to some extent towards the water, across the edges of the beds or layers, the hollows are, in consequence, found to be deeper on their landward side. (see section).

* Pen,—head, end or extremity; Tyr,—land; (Cornu-Brit: Lexicon).

Each depression then, is a circular, flat-bottomed, shallow pit, much resembling one bored by an immense auger, but the cutting must have been done by hand with some other tool, for the circumferences of the pits are not all exactly circular, though of fairly round form, nor are they quite uniform in size.

There is one great peculiarity,—they are not all clear of each other, nor are they of equal depth. Many overlap, or are cut partially into, upon, and down through each other! Above, they appear tilted with the slope of the surface of the rock or cliff. Below, they follow the inclination of strata. They taper slightly, being rather narrower towards the bottom. On measuring some of them, they were found to be 15, 16, and 20 inches in diameter by several inches in depth. At a close view no design nor arrangement can be perceived in their position, except that they are well in sight some feet above the water. From a distance this may be different. In a sketch made on the spot, but not to scale, a conjunction of circles almost cruciform appears nearly in the centre of the main group.

To realize the appearance of the hollows one must “draw on the imagination,” and suppose that, whilst the mass of rock was soft, and ere it had assumed a slanting position, some giant, frenzied, blind or working in the dark, had lifted a great tapering flower-pot, large jar, or nine-gallon cask, and had struck downward, with the bottom of it, 30 or 40 times. Each pit resembles one of the impressions that would have been so caused. Their intermingling suggests that instead of each blow having descended on a fresh spot, some did so, but many hit the marks already made, and either partially or wholly passed through them.

The following conjectures have been offered, to account for these rock-marks :—

- (1). They were cut perhaps by the Phœnicians to commemorate their visits to the locality.
- (2). They were scooped out, some say, by persons condemned to hard labor as a punishment, the position being dangerous for the workmen and the work difficult. This is what the oldest inhabitant has heard.

- (3). They were hollowed out, others allege, by smugglers, for the steadying of kegs on the sloping rocks when running a cargo of contraband spirits for concealment in the neighbouring cave. They seem however to be too much tilted for such a purpose.
- (4). They are hollows from which, it is said, stone caps may have been cut out for placing on upright supports of corn-ricks as a safeguard against the approach of rats and mice. Such caps, however, could have been formed more easily from flat stones.
- (5). They mark a portion of coast at which there is a deep channel close to the shore, a whirlpool, dangerous quicksands, and a cave. They may therefore have been cut as a direction or warning to boat-men and bathers.
- (6). Being circular, like the orb of day, and facing towards the west or south-west, they may have been connected with sun-worship: compare this surmise with the following words written by Mr. Borlase in his account of some archæological discoveries in West Cornwall :—

“The question suggests itself, was there any meaning attached to the persistent preference for the western and south-western sides, and for a western aspect? Was there any reason why those portions of our Cornish coast which face in this direction should be crowned with tumuli, while far fewer, if any, are found on those which have an eastern or north-eastern aspect? I do not think it is the result of mere accident. I think we may fairly regard this grouping along our western cliffs as relics of, if not a solar worship, a superstition connected with, or inherited from, such a worship.....Mr. Greenwell after his great experience among the tumuli of northern and central England has noticed that the dead are generally placed in the grave facing the sun”.....“The west” [the region of the setting sun]—“has been ‘the death-quarter’ of very many ages, and of nearly all our mythology and folk lore.”*

* B. I. C. Journal, Vol. 6, p. 200.

- (7). The marks, if many of them were not too horizontal, might have been conjectured to have been caused by stone or iron cannon-balls fired against the Gannel's rocky shore by some ship during gun-practice.
- (8). The theory that they are natural, has not been put forward, as far as I am aware, by anyone who has seen them, but it would be desirable that geologists should examine and report upon them.

Any probable explanation will be welcome, and, if such be offered, will be duly noted.

A careful inspection of their appearance from the water and from the opposite shore should be made. Photographs and exact measurements also should be taken. These I have been hindered from obtaining by the state of the tides, and by inclement weather.

To prevent any confusion or mistake, it must here be stated that these slate-rock-cuttings are quite different and distinct from the curious geological phenomena met with on the shores of Fistral Bay, nearer Newquay, where perpendicular sand-towers, as they are locally called, like hollow cylinders many feet in height or depth, have been formed in the sand-stone above the level of the present beach.

(II). CINERARY URNS AND THEIR CONTENTS.

Since the publication in 1872 of *Nænia Cornubiæ*, Mr. Borlase and others have discovered several additional specimens of Cornish cinerary Urns. Amongst them those of Boscregan* and Tregaseal.† The latter, 21 inches high and nearly 16 broad, has been sometimes erroneously described (like one of the former), as the largest found in the county; the remarkable cross‡ of raised pottery on the bottom of it within was formed,

*B. I. C. Journal, Vol. 6, p. 190.

†Prehistoric Stone Monuments, Lukis & Borlase, 1885, p. 7, pl. xvii.

‡For other instances of cross designs, see Thurnam in *Archæologia*, Vol. 43, pp. 369, 370, 383, 385, 392, 397, 527, 568. At page 398 he discusses the significance of heathen crosses.

some have thought, merely to strengthen it. This great urn, dug from its barrow in 1879, I saw purchased in 1887, by Mr. Franks, for the British Museum, which now contains it.*

In 1881 a large urn was found in a barrow on the north-east side of Hustyn-hill. Its fragments were figured and described by me in this Journal,† and were then presented to our Truro Museum.

*At the time of the purchase Mr. Franks stated, that until then, there had not been a single Cornish cinerary urn in the national collection. *The largest Cornish urn known, seems to be the "Denzell great urn,"* the fragments of which I secured, at the Laregan sale, for the Royal Institution of Cornwall. Mr. Borlase stated, that it cannot have been much less than 2 or 3 feet in height.



His restoration of its appearance is shewn in the accompanying illustration (see *Nænia Cornubiæ*, pp. 242-4). The pieces of it are now in our Museum at Truro.

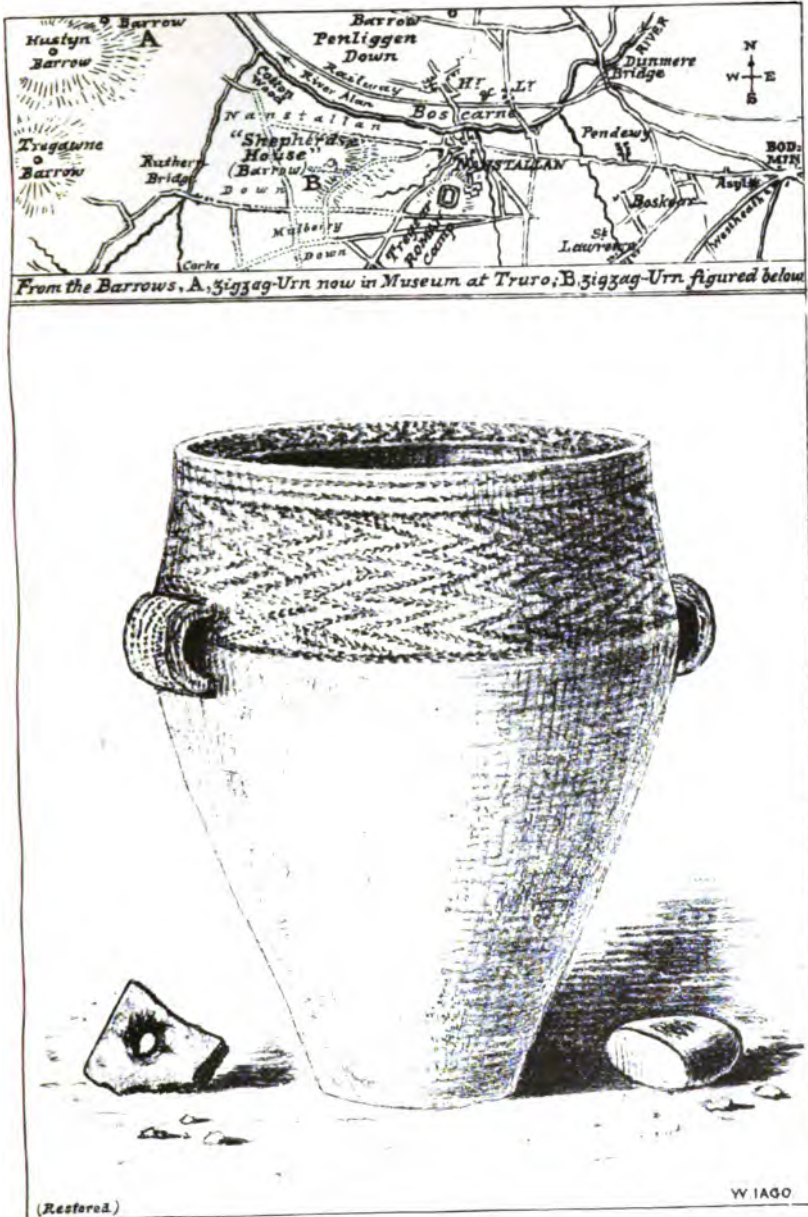
†*Royal Inst. Corn. Journal*, Vol. VII, p. 141.

Other urns have since been disclosed. A detailed account of some of these I will now give:—

NANSTALLON-DOWN URN.

A crematory urn very similar to those already mentioned was discovered early in April, 1883, in a tumulus or barrow called a "Shepherd's House," situate on New Down, beside the ancient trackway leading from Ruthern-bridge, viâ Nanstallon, to Bodmin. Mr. B. F. Edyvean kindly acquainted me with its discovery, and referred me to Mr. Fowler who farmed the ground. They, with the actual finder of the relic, facilitated my acquiring as many of the fragments as we jointly were able to collect, and fortunately these suffice to indicate the size and whole design of the urn. The finder, John Northcott, labourer, informed me that his master, not suspecting that the mound contained anything of interest, directed him to "rip it up, and spread it over the field." He proceeded to do so, and found the sepulchral deposit, not in the centre but towards the western side of the barrow. The urn stood "mouth upward, on a beautifully clean floor," but not on a slab. "Spar-stones of handy size had been placed in, closely around it, to fill up the space about it." He did not at first recognize what it was, as earth or mould encumbered it, but when a fracture of it revealed some appearance of yellow clay or pottery, he cleared off the earth from the fragments. The urn had been somewhat crushed, he considered, before he smashed it. Its contents were black and oily with bits of white bone projecting. The mass, permeated with roots and fibres, had become so hard and tough that he could scarcely force his pick or shovel through it.

On visiting the site, on May 2nd, 12th, and 16th, in consequence of the discovery made, I gathered as many fragments of the urn as I could find. The whole area of the tumulus had then been levelled and reduced to fine earth, surrounding which was a considerable ring of piled-up stones, chiefly quartz or spar, which had composed the cairn. Amongst the rough stones Northcott found half of a smooth, water-worn pebble. The piece is 3 inches long, 3-in. wide at the fracture, and 1½-in. thick. On one face are transverse scratches as if it had been used for striking a light.



Hangfallen Down Urn

A rather rough holed-stone, perhaps a spindle-whorl, triangular, but before breakage square, was also picked up. It is a miniature *mên-an-tol*, or *tolvên*, 3 or 4 inches across and $\frac{3}{4}$ -in. thick. The hole about $\frac{1}{2}$ -in. in diameter, is irregularly bevelled, and tool marks shew that the piercing was effected by cutting into both faces of the stone till perforation was produced.

The urn, in form, size, and adornment, much resembles the Hustyn specimen found in the same neighbourhood.

It rises from a circular, flat base, and gradually widens as far up as the two handles, which are of broad looped form. Thence, forming a graceful bulge, it slightly contracts and then again expands a little, towards the brim.

The fragments shew its dimensions :—

Height of urn	about 20 inches.
Diameter at mouth	15 "
" " bulge	17 "
" " base	6 "
Height and width of handles.. ..	3 $\frac{1}{2}$ "
Projection of handles	1 $\frac{1}{4}$ "
Thickness "	$\frac{3}{4}$ "
Opening "	1 by 1 $\frac{1}{2}$ "
Depth of brim-bevel, within	1 $\frac{1}{2}$ "
Thickness of brim, at edge	$\frac{1}{2}$ "
" at lower part of bevel	$\frac{3}{4}$ "
" sides	$\frac{1}{2}$ -in. or less.
" base	$\frac{3}{4}$ -in. nearly.

The contour and ornamentation are good. A potter's wheel* must have been used in the manufacture of the urn. The pottery has a smooth surface, and seems to have been slightly burned, being tolerably firm but easily crumbled. It is unglazed. The colour is a deep sober brown approaching to black.

All the adornments have been effected by pressing a close three-stranded plait of rushes or fine thongs on the clay whilst it was soft. Such impression has caused each line to resemble a continuous double row of corn-grains arranged as in a wheat-ear.

Below the handles the pottery is plain. Upon them and on the upper part of the urn and on the bevel within its brim the patterns appear.

* Most writers state that the Celtic urn-makers did not use a wheel, but see "*Nenia*," p. 140, with which I agree.

The handles consist of flat slices of clay bent and attached semicircularly, leaving horizontal openings. Each handle displays 8 vertical stripes or lines of plait with 2 across the top and one on each flat edge.

On a level with the upper part of the hole of each handle, a single horizontal line of plait encircles the urn at its bulge. Three other parallel lines run round nearer the brim.

Between the triplet and the single line the intervening space, 4 inches in depth, is filled with perpendicular lines of zig-zag. Each of these is composed of about $3\frac{1}{2}$ connected chevrons, pointing sideways. There must have been at least 50 of these zig-zag lines, and some of them amalgamate without any appearance of confusion.

At the mouth of the urn the brim is sloped down towards the interior. On this inner bevel a couple of horizontal lines run round enclosing between them a band of single chevrons, each apex pointing to the right.

Amidst the conglomerate of ashes, burnt bones, roots, &c., found within the urn, and now broken into several lumps, I have not yet been able to discover any other objects of interest.

Several other urns, I am told, have been found in the district, which abounds with ancient remains, mostly Celtic or British apparently, and not far off is the Roman camp of 'Tregear'—(a description of its relics will be given later). There are traces of several sepulchral tumuli, in its vicinity, nearly all of which have been destroyed. One urn was dug out whole and placed on the ground near the camp, my informant said, but sheep came and broke it, before the finder returned, and the pieces were not preserved.

HARLYN-BAY URN, INCENSE-CUP, & OTHER RELICS.

Specially interesting finds have been made on the shores of Harlyn or Perleze Bay near Padstow, and in fact all along Cornwall's grand north coast.

From this bay came the golden lunettes* (found with bronze celt, &c.) which are now in our Museum at Truro, having been placed there, in a suitable case, at a subscribed cost of £55.

* R. I. C. Journal, Vol. 2, pp. IX, XVI., 134 (and plates illustrating same).

Mr. Tom Hellyar, of Harlyn House, told me how, one day (when his father lived there) a labourer came in from work with some strange ornaments, thought to be of thin brass or other base metal, encircled or twisted about his legs. The man had found them in digging, and put them on (in sport) not suspecting their real value. His act will account for the crumpled appearance of the gold. They were dug from a mound on a moderately low cliff near Catacluse point, the western bluff of the bay. I was shewn the spot,*—near it is a path leading to and from the beach. On the headland itself are several unopened barrows composed, to a great extent, of "spar-stones."†

The rocks surrounding the bay are very friable and are rapidly flaking away. Above them is a considerable deposit of sand, with turf and spire grass growing on the upper surface.

By the force of storms the coast is becoming more and more exposed in section. The sea by its encroachments is cutting down the cliffs perpendicularly and scattering the débris. One result has been the curious discovery next to be described :—

From time to time, Mr. Hellyar informed me, portions of human skeletons have been brought into view; and on one occasion, in the Autumn of 1887, he (whilst walking on the beach) observed an Urn embedded in the face of the cliff. It had not previously been noticed. He removed it, together with its very interesting contents, and shortly afterwards showed me the impression it had left, also the horizontal stone (in situ) which had covered it, and the relics in his possession.

Having carefully examined the objects, and taken sketches and measurements, on the spot, before rough weather had obliterated the traces of the urn's position, I am able to supply the following details :—

The urn, a large one with loop handles, was disclosed by the falling away of the ground between it and the sea. It appeared at a depth of more than 30 feet below the summit of

*A spring of water drips down over the rocks. To cut the spring and form a pool above, was the work which led to the discovery of the lunettes, &c. Yellow spar stones forming the barrow are still in the ground, and beneath the adjoining field can be seen a layer of ashes and charcoal just above the pool.

†One of the barrows on the headland has been opened. Under the stones bones were found but no urn.

the cliff, and at an elevation of about 7 feet above the ordinary level of the beach. It stood, mouth upward, covered by a wide flat stone. Its circular flat base rested in a pit (a few inches deep) cut in the natural rock. The upper part of the urn was enclosed in brown earth, which extended upward from the rock to a height of 1 foot 3 inches above the covering slab of the urn, completely burying all.

The burial pit may perhaps have been dug down through the earth till rock was reached, and then, after a little excavation of it, further digging was discontinued on account of its hardness, for the earth appears to be part of a layer of marl, which can be traced to the neighbouring point.

The heavy mounds of sand above, were seen to contain some stonework. Part of their sandy bulk may have accumulated, by drifts, during the many centuries which have elapsed since the urn was deposited in its place. We shall presently have to consider whether they are natural or not.

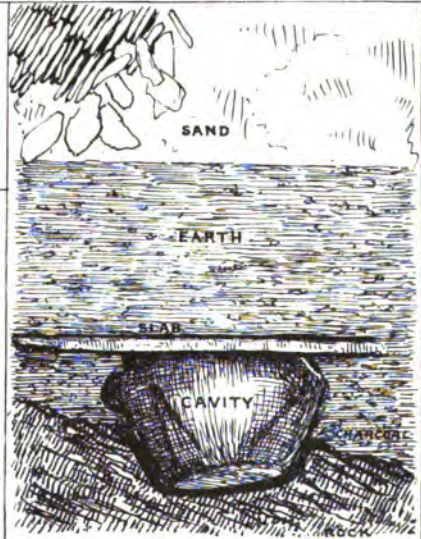
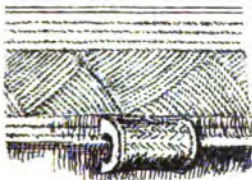
From what has been stated, it will be perceived that the stratification, in downward order, appeared thus in the cliff section :—

- (1). Spire-grass or turf—on top surface.
- (2). Sand—30 or more feet in depth, (containing portions of stone-work).
- (3). Earth, and Marl—about 2 feet 4 inches in depth, (containing the slab, and the urn with its contents).
- (4). Rock—(bottom of urn inserted in it). The mass of hard strata extending down about 7 feet to beach level, and to unknown depth below the sandy beach.

As to the sand-hills at this spot, and the stone-work below them, I think they are not chance accumulations.

The stone-work consists of masonry, known as "upright work," small flat handy pieces regularly and closely laid together on edge, without mortar, slanting like hedging.

Two masses inclined in opposite directions appeared in section higher up than the bed of earth covering the urn, and contiguous to one sand-mound a further portion at the lowest part of the surface above. In the earth below this, to the west, a skeleton was exposed.



0 1 2 FEET.
SCALE.

Harlyn Bay Urn, Va.

W. J. AGO.

At first sight I imagined the neat rude walling to be the ruin of some hedge swallowed up in the sand or destroyed by a land-slip,—but now I consider the vestiges to have been structural parts of a barrow or barrows, in original position.

The undulatory form of the sandy cliff summit, supports this view, and indicates that the discovered urn (others may yet be found near) was surmounted by a tumulus, perhaps by one of a group.

If the highest sand-hill nearest to it and partly over it should prove to be its barrow, unaltered in size and outline, the urn must have been interred beneath its western side, but so much sand has fallen down to the beach, from over the site of the urn, that the true apex of its tumulus may have disappeared.

Such extensive sand-slips have taken place, that we cannot with certainty determine what were the sizes and arrangement of the mounds when they were first reared.

On re-examining the cliff on the 22nd of February, 1890, I found that much more had been carried away by wind and sea.

The great sand-heap remaining, may have had within it a cairn or dome protecting the urn. It may also have had a surrounding rampart, formed like itself of stones and sand,—or, the conjectured rampart may have been a second barrow, now reduced in size, with cairn, or with stone-work built around to strengthen its base, (raised over the skeleton).

We now proceed to a description of the objects found, and, so far as Cornwall is concerned, I believe one of them to be unique, and therefore of extreme interest:—

- | | | |
|------|---|-------------------|
| (A). | Flat stone, resting on mouth of urn. | |
| (B). | Large urn, with 2 handles. | |
| (C). | Small cup, with 2 perforations, | } within the urn. |
| (D). | Bronze dagger-knife, with 2 rivets, | |
| (E). | Bronze awl, or pin, | |
| (F). | Burnt Bones, | |
| (G). | One or two stones, somewhat celt-like in form, found in or near the urn. Also a pierced stone spindle whorl, picked up at the same place, subsequently. | |

With regard to such an association of relics, Hoare has recorded of other deposits that out of 68 collections of burnt bones, found in urns in round barrows, about one-fourth were accompanied by bronze knife-daggers or by awls, and one (as in this instance) by both. Borlase has also described bronze daggers found with Cornish urns.

(A). The covering slab was of slate, about 4-ft. long, and $1\frac{1}{2}$ -in. thick.

(B). The urn's general form appeared in the impression or cast of it which the earth had taken, but this did not give its true height, for the upper portion had been crushed down by superincumbent weight into the lower, spreading the base.

Between the urn and the rock was an under-layer of black burnt earth or charcoal, $\frac{3}{4}$ -in. thick, which perhaps had escaped through the fractures of the pottery.

The true dimensions of the urn compared with those of the space into which it had been compressed were the following :—

URN ITSELF.		EARTH-CAST OF URN.	
	Inches.		Inches.
Height.. .. .	20 $\frac{1}{2}$..	.. .. .	11
„ from top of handles } up to brim.. }	5 $\frac{1}{2}$..	.. .. .	1 $\frac{1}{2}$
„ from bottoms of handles } down to base }	13 ..	.. .. .	7
Diameter at mouth	15 ..	.. .. .	15
„ outside the handles	20 ..	.. .. .	20
„ at base	6 $\frac{1}{2}$..	.. .. .	11
Thickness of brim	$\frac{1}{2}$	[The effect produced by the crushing is shewn in the illustration.]	
„ sides	$\frac{3}{4}$		
„ base	$\frac{1}{2}$		
„ handles.. ..	$\frac{1}{2}$		
Width of handles	4 $\frac{1}{2}$		
Height of „	3		
Projection of „	2		
Diam. of horizontal holes..	1		

The urn, from the regularity of its curving, seems to have been formed on a potter's wheel. In shape it tapers upward and outward from its flat circular base, as far as its bulge, around which is a slight projection. Thence upward it contracts, and finally expands gradually towards the brim. The top edge is bevelled down outward. Its two handles are broad curved loops spanning the bulge. In color it is of a drab pale brown. The urn is clean within for about one third of its height, above that it is blackened as if by smoke from its smouldering contents.

Ornamentation has been effected by the impress of a cord or twist, not by means of a plait. Below the handles, the sides are plain. They and the portion above the bulge are adorned. On each handle are several horizontal rows of diagonal lines forming vertical irregular zigzags bounded above with a horizontal line. On one handle each zigzag consists of 3 imperfect chevrons, on the other of $2\frac{1}{2}$.

Within the mouth, on the inner slope below the brim, a band of ornament runs round formed of two horizontal lines enclosing a row of chevrons with their apices to the right.

Outside, just below the brim, are four horizontal encircling lines, and just above the bulge three others. The intervening space, $4\frac{1}{2}$ inches deep, between these sets of lines, is filled with triangular batches of diagonal parallel lines (from 12 to 17 in each), so arranged as to slant alternately in contrary directions and form a zigzag design. This chief pattern, which encircles the urn above the handles, has not hitherto been figured as occurring on Cornish examples, though the Gerrans, Portscatha, Denzell, and Trannack urns have adornments approaching to it in style,—but it has been met with in other counties, for instance at Oldbury in North Wilts,* at Darley Dale, and Hitter Hill in Derbyshire,† and in Staffordshire,‡ whilst in Lancashire§ a design very similar to it has been found. It also occurs on incense-cups|| in Glamorgan and Aberdeen.

*Archæologia, Vol. 43, Pl. xxx, fig. 3, and p. 349.

†Jewitt's Grave Mounds and their contents, figs. 93, 98, 104.

‡" " " fig. 85.

§" " " fig. 90.

||Archæologia, Vol. 43, figs. 43, 61.

(C). The little perforated cup, technically but perhaps erroneously* named an "incense cup," found within the urn, is of far greater interest than any other portion of the find, because it seems to be the only one known to exist in the county. It is probably unique.

Its form is that of a small round thick bason, the base flat and circular, the sides bulging outward as they rise, the brim broad and inclined downward towards the interior. Two holes are neatly pierced close together in one side at about half way up the inner depth. They are small and so near each other that together they are included in a space only $\frac{1}{8}$ of an inch wide. The color of the vessel, like that of the urn, is a drab pale brown. The burning is slight, and there is no glaze. The dimensions of the cup are:—

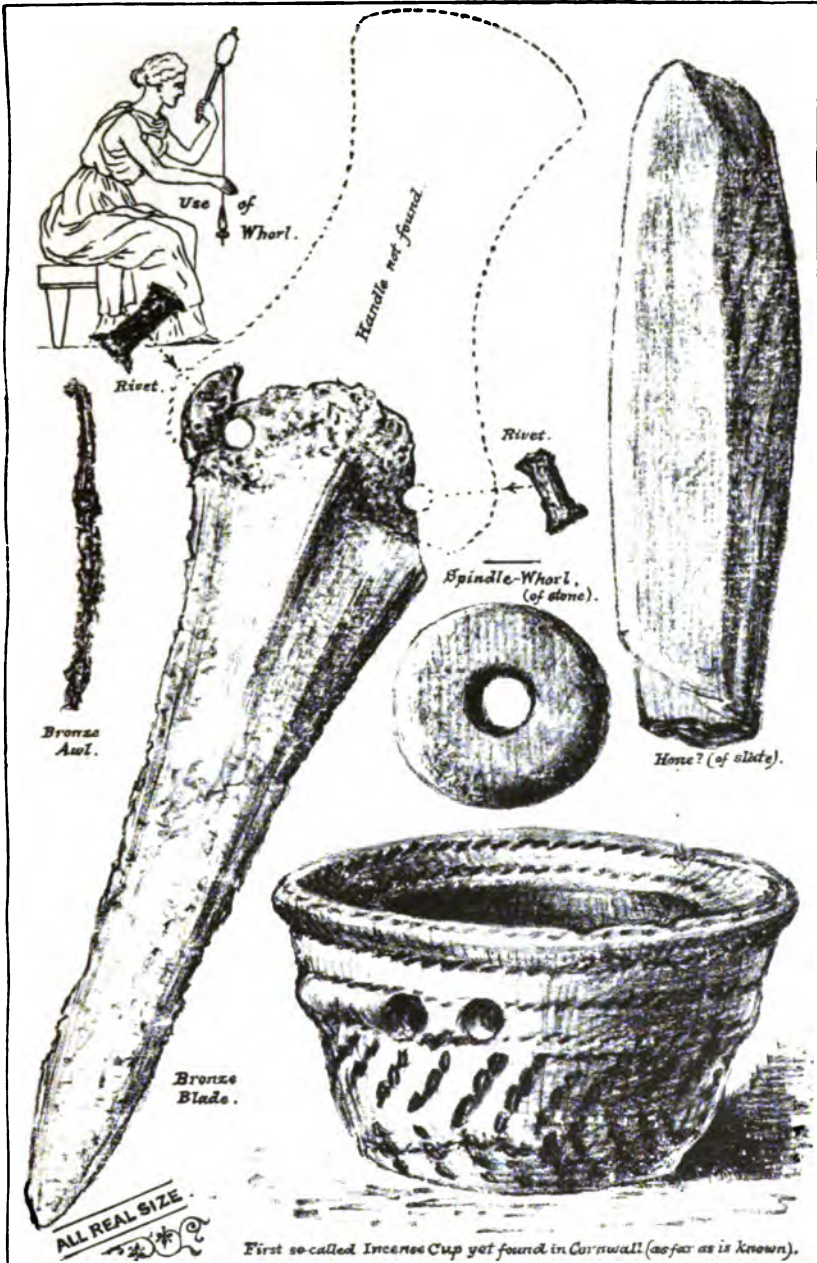
Height	$1\frac{1}{2}$ inches.
Depth within	1 "
Diameter at brim	$2\frac{1}{2}$ "
,, within	$1\frac{1}{2}$ "
,, of base	$1\frac{1}{8}$ "
,, of perforations	$\frac{3}{16}$ "
Width of space between them	$\frac{3}{16}$ "
Thickness of side	$\frac{3}{16}$ "
,, of brim.. .. .	$\frac{1}{8}$ "

For ornament, on the brim 3 lines run round; below the brim, outside, 3 others; lower still a series of single chevrons pointing to the left; the bottom and interior are plain.

Referring to fictilia of this class Mr. Borlase wrote:—"Of incense cups there no examples in Cornwall."¶ He described miniature urns, averaging from $4\frac{1}{2}$ to 6 inches in height, but even those were not so small as this little object. Mr. Worth

* Jewitt states that in grave mounds of the Celtic period, the pottery found consists of:—

1. Sepulchral urns, with calcined human bones.
 2. Incense cups "erroneously so called for want of more knowledge of their use,—a name which ought to be discarded," found only with burnt bones in large cinerary urns.
 3. Food vessels } more usually found with unburnt bodies (Grave Mounds,
 4. Drinking cups } pp. 84, 105).
- ¶ Næmia, p. 146.



Found with Early Bay Tree containing Cremated Interment.

has recorded* the finding of something which may perhaps have been a cup of this class. Figuring a large urn, very much like those we have been describing, he states that it was found in the Cheesewring district, and contained ashes, calcined human bones, and "in the centre a smaller vessel described as resembling a plate with a hole in the centre and a raised rim, supported on four little legs or pillars, no portion of which was preserved." Probably it was an "incense cup" which had lost its base, so that its brim enclosed merely the open hollow, whilst the supporting legs were but portions of the sides which had extended downwards between perforations.

Such cups as the one found in the Harlyn urn, have been occasionally discovered in districts out of Cornwall; many are known, but the purpose for which they were formed is doubtful.

Jewitt figures 12 of them, and observes:—"When found at all (which is seldom) they are inside urns, on or among the calcined bones, and frequently filled with them. They range from $1\frac{1}{4}$ inches to 3 inches in height, and are sometimes highly ornamented."

Thurnam shews 23 examples in one of his accounts, and after describing some with handles and others with numerous openings, he remarks:—"Notwithstanding exceptions, the general rule is to have two holes on one side only." This is the case in the instance before us.

The material, design, and surrounding associations of these cups, shew them to have been of some funereal or sepulchral use. The perforations scarcely seem to have been made for their suspension, moreover if a short handle had been needed it would probably have been formed of clay, as were those on the urn, and a long handle would not have required two small holes for its attachment, since one opening of fair size would have admitted the end of a stick to serve for such a purpose.

The little vessels are called "incense cups," for the sake of convenience, because some of them are so much pierced that they cannot hold more than a few drops of liquid, but would afford good ventilation to a burning substance such as a pastile or a mass of leaves, or spices placed within them; but whether

*Plymouth Institution Report, 1888, Vol. x, p. 244.

they were used for fumigation whilst the human body was undergoing cremation, or were charged with oil and wick as funeral lamps for lighting the pyre, or were intended to hold infants' relics or those of birds, or were little libation bowls through which some liquor was poured,—small streams issuing from the side holes,* or whether they were made for some quite different purpose, has often been discussed but not yet decided.

(D). The knife-dagger, with 2 rivets, found in the urn, is a blade of brightly polished bronze, encrusted on both faces, to some extent, with *æruugo* (*verdigris*). It is beautifully cast, of tapering flamboyant form, leaf-like towards the point, and is relieved from flatness by a duplex midrib and bevelled edges,—the latter are very sharp. It is not tanged. The mark of the distal extremity of its handle can be seen over and between its rivet-holes. The line is of the usual form, viz. : horizontal with semicircular dip in the centre.

Four inches of blade projected beyond the handle, which must have been flat and wide where riveted, but has perished.

The blade is $4\frac{1}{2}$ inches long.

„ „ $1\frac{1}{2}$ „ broad at base, across the rivet-holes.

„ „ $\frac{1}{4}$ „ „ near the tip.

Each rivet is $\frac{1}{16}$ „ long (equal to thickness of flat haft).

„ „ $\frac{1}{4}$ „ thick (each end being spread wider by hammering).

Bronze knife-daggers of this class have been found in several places in Cornwall, *e.g.*, at Angrowse in Mullion (in a chevroned urn), at Benallack near Par, &c.;† others, (of which some are of exactly the same size as that under consideration), in a great many other places.‡

(E). The bronze awl, or pin, much corroded and slightly curved, also found in the urn, has been broken in two, but was in one length when first I saw it.

*Amongst the Romans (from whom, Borlase thinks, the Britons learned cremation), "when the pile was burnt down the embers were slaked with wine, and the bones and ashes of the deceased were gathered by the nearest relations, who sprinkled them with perfumes and placed them in a vessel called *urna*." (Smith's Dictionary of Antiquities, "Funus.")

†*Nenia*, pp. 5, 236.

‡See *Archæologia*, Vol. 43, p. 448, &c., and many other works.

It is $1\frac{1}{2}$ inches long.

And about $\frac{1}{8}$ in. or less, thick.

Thurnam in describing such objects has remarked :—"The majority are from 1 to 2 inches in length."*

(F). The deposit of burnt bones (the main object of all these surroundings), has not crumbled into very minute fragments, like those in the other urns described by me; but amongst them I observe vertebræ, ribs, knobs of joints, pieces of bone from 2 to $3\frac{1}{2}$ inches in length, also portions of skull, and a tooth. They evidently represent an adult. The sex I have not yet been able to ascertain.

(G). Of stones which may have been used as tools, one is a piece of yellowish catacluse, something like a clumsy celt, $6\frac{1}{2}$ -inches long; the other is of slate, and resembles a two-edged knife, $3\frac{1}{2}$ -inches long by 1-inch wide. It is very smooth, and seems to have been sharpened purposely, or else through having been used as a hone. A neatly-made spindle-whorl was found afterwards at or near the spot. It is flat and rounded, and was pierced from its two opposite faces till the hole was bored. Size of whorl:— $1\frac{1}{8}$ in. diameter, $\frac{1}{2}$ in. thick, $\frac{5}{16}$ in. diameter of hole.

Having now given a detailed account of the latest discoveries in Harlyn Bay, &c., I will only add that, with regard to age, these Celto-British or perhaps Romano-British relics belong to the 3rd period given in Sir John Lubbock's undermentioned classification of ancient remains, viz.—

1. Drift Period, Palæolithic,—stray skeletons.
2. Polished stone, Neolithic,—contracted interments.
3. Bronze age,—cremated burials.
4. Iron ,, —extended ,,

He gives the date of the continental transition from the Bronze age to the Iron, as about the time of the Trojan war, (i.e. circa 1184,† B.C.) but Bronze, as the almost exclusively popular metal, was continued amongst the Britons and others, to a far later time, and Mr. Borlase would regard these urns and weapons as of the Romano-British period. The Harlyn relics are clearly of pre-Christian age. Let those, then, who best know how to do so, decide as to their antiquity. It seems, that they may be at least 2,000 years old.

*Idem, p. 465.

†Haydn; or 1316-07, B.C., Gladstone.

LANGUAGE OF THE CORNISH.

(TAVAZETH KERNUAK).

The linguistic sounds uttered by the old heathen inhabitants of the west,—the rock-markers, the builders of rude stone enclosures and of earth mounds, &c., whose relics have just been described,—have not been communicated to us by means of any characters traced by their hands, but yet, I think, the very echo of the words they spoke resounds amid the hills and valleys of the Cornwall of to-day.

Their ancient utterances, instead of having died out, are still heard whenever we pronounce (like natives) the old names which have clung to certain places, natural objects, and antique remains.

Such terms as the following, familiar to us all, were probably used by the old dwellers in Kernow or Cornubia long before a knowledge of Christianity was introduced among them:—

Coit, a horizontal flat stone.

Men-hir, stone long, *i.e.*, a long or tall stone, set erect.

Pen-tire, head of land, headland.

Tre-geare, place of war, war-place, camp.

Tintagel, (din or dun,—diogel), Fortress-secure, or sure.

Brownwilly, (bre, brea, bray, bryn or bron,—uhella), hill-highest, highest hill.

As Christianity became known to the Celts, it greatly augmented their simple language, and brought into it several foreign terms connected with itself.

It is clear that originally the Celtic language in Cornwall and Wales did not contain such words as Eglos, Eglwys, (church, from the Greek ecclesia; Credgyans an abesteleth, Creed of the Apostles; Escop, Ebscob, Bishop, from the (Greek episcopos); nor of course Lis-escop,* Court or Palace of the Bishop. They are of later formation, and were added as the language expanded with time and civilization, and the last of them was brought into use in our own day. (Lis, or Les, is an early word).

* Chosen by Bishop Benson (now Archbishop) as a new title for the old Vicarage House, Kenwyn, when it had become his episcopal residence in the Truro Diocese.

Still the old words held their place, and many of them have continued to be spoken down to this very date, notwithstanding the hostile and friendly invasions into Cornwall of other dialects.

The Cornu-British language as a whole has been rescued from oblivion in an intelligible and practical form by modern compilers and lexicographers,* who have studied the subject locally, and collected details from mediæval manuscripts.

The very words then, which were spoken in Cornwall by the heathen Celts or Britons, whose cremated bodies occupy the urns before us, are still heard in the land.

(III). ROMAN REMAINS.

When the Britons in the west had become subject, directly or indirectly, to the influence of the Roman Empire (the great dispenser of education in the old world), intelligible words instead of mere rock-marks, inscribed on stone, were set up for particular purposes; and various small articles such as coins and bowls bearing inscriptions were brought into Cornwall.

Many inscribed relics remain. A few purely Roman, others Romano-British.

Judged by the characters in which the legends are cut, it is evident that the genuine Roman (the work of the instructors) are the earlier.

It has been my good fortune to discover perhaps the oldest inscribed stone of all yet brought to light in the County. If it be not the oldest, it is contemporaneous with the most ancient that has been found, and the two, closely connected by historical associations, form a pair, of the same era. They will presently be described.

Much discussion has taken place as to the nature of the Roman domination or occupation of Cornwall.† Some have thought that the imperial troops took forcible possession, and constructed roads. Others that nothing more than commerce and trade were attempted, and that such roads as were required for traffic had already been formed by the natives. Peaceful

*See Williams's Cornu. Brit. Lexicon, Bannister's Glossary of Cornish names, and Dr. F. W. P. Jago's English-Cornish Dictionary.

†See Borlase's Antiquities (Book iv, chapters 1-6). Also the Surveys and Histories of Cornwall, and Hübner's Corpus Inscip. Lat. (Vol. vii, p. 12). Also the writings of Mr. N. Whitley, Mr. R. N. Worth, Sir J. Maclean, &c.

intercourse was therefore carried on, the roads or tracks serving the general purposes of all, and only a few sheltering camps being intrenched in certain safe positions for such troops as might be quartered in a non-hostile country.

Whatever may have been the case with regard to all this, we have, in the absence of records, few satisfactory means of judging. Roman villas, altars, and slabs dedicated to the gods of the shades, so frequently met with elsewhere, do not occur in Cornwall. Parallel-sided Roman camps are scarce, but circular* British earthworks crown the hills in all directions.

Some facts relating to the Romans in Cornwall are incontrovertible, and may be thus summarized:—

(1). There is a Roman camp still existing at Tregeare, by Nanstallon, Bodmin, in Mid-Cornwall, in or near which 1st century coins, human remains, and other relics have been found.

(2). Another camp, at Bosens in St. Erth, in West Cornwall, has yielded evidence of the Roman worship of Mars,† the god of war.

(3). Stones proclaiming the names of two reigning Roman Emperors, of the 4th century, exist, one at Tintagel in the north-east of Cornwall, the other at St. Hilary in the south-west.

(4). Many great hoards, or military supplies, of small bronze Roman money have been found in places near the coast. One collection consisted of at least 2,000 coins, another of 20-lbs. weight, a third of 24 gallons, &c.

(5). A station, revealing from time to time various Roman vestiges, has been discovered in St. Minver, opposite Padstow, on the northern estuary, near a road, Plain Street,‡ which seems to bear a Roman name,—*Plana Strata*, i.e., level road.

*The Cornish name for such a stronghold is *Dinas*. This led Dr. Borlase to regard them as Danish. Some consider them late Roman.

†Many of the Roman coins found in Cornwall have a figure of Mars with corresponding legend, on their reverses.

‡Unless this name can be shewn to have a recent and local meaning which would account differently for it, it is suggestive of a late Roman origin.—

Planus, a, um; adj: level. "*facilis et plana via*" (Plautus).

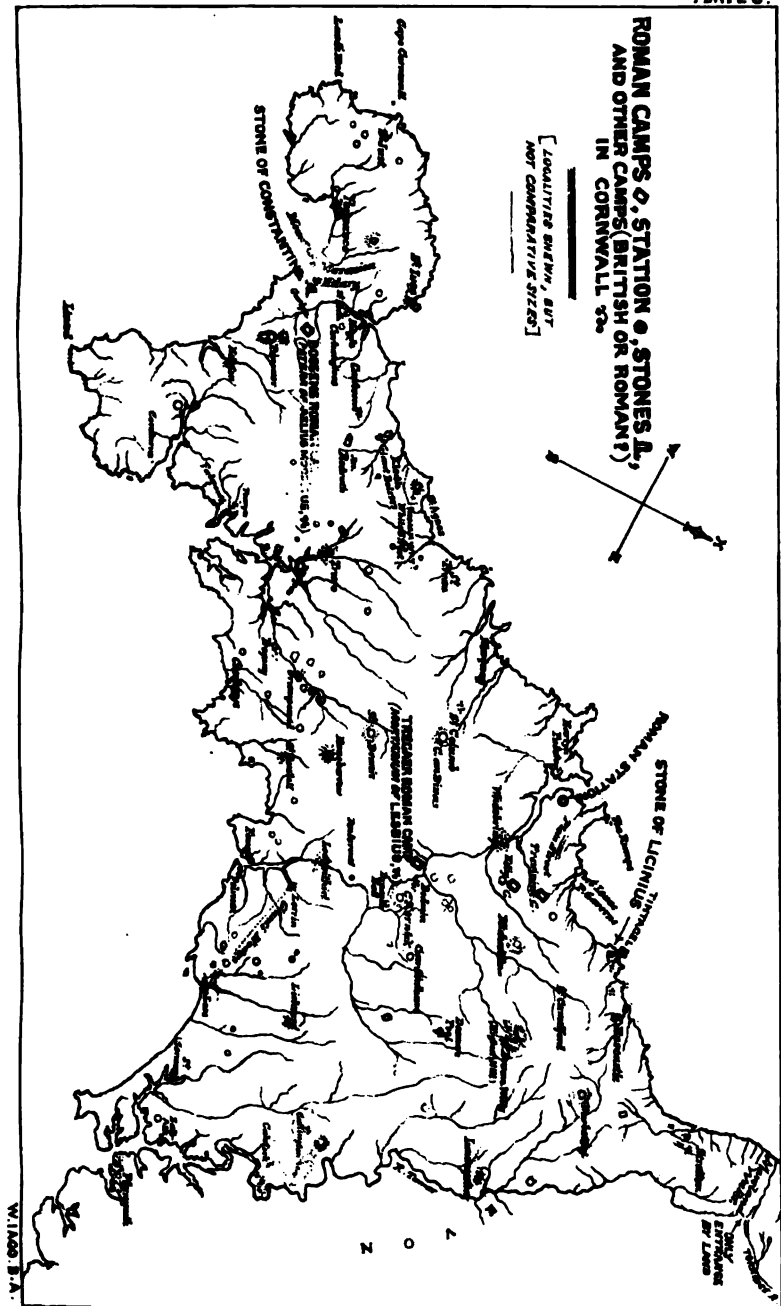
"*planissimus locus*" (Cicero).

Sterno, stratus, &c.; v: to spread, extend. "*fama stravit iter*" (Statius).

"*stratum militari labore iter*" (Quintilianus).

Stratum, i; n: in post-Augustan prose, pavement, &c. (Andrews).

Strata (low Latin, from *sterno*), scilicet *via*, a street, paved way, road (Webster).



We will now refer to these finds and to recent discoveries in connection with some of them :—

TREGAER CAMP, NANSTALLON.

This Roman intrenchment, situate about 2½ miles west of the town of Bodmin, must have been constructed in the first century of the Christian era, if it be contemporaneous with the coins found in or near it ;—they being of Roman Emperors whose reigns commenced in A.D. 70 and 98.

It stands, according to Mac Lauchlan's description, on a gentle declivity about 450 yards south of the river Alan. It overlooks Nanstallon and commands what was the ford of the river below, which is now crossed by a bridge.

Raised between two small streams, and with the river in front, it looks towards the north ; its entrance being in the middle of the south rampart or rear. There were tumuli around it. Near it, on the west and north, runs *Bury Lane.

In form, this camp originally agreed with other well-known Roman military intrenchments. The four straight sides would have enclosed a complete rectangular parallelogram had not the angles been, as usual, rounded off.

The embankments which compose it are said to be about 330 feet long from north to south, and about 260 from east to west.

Its ditch or fosse had been, in course of time, filled up, consequently its existence as a camp had been forgotten, till in or about the year 1817 ; when its true character seems to have been again recognized.† In 1831 and perhaps earlier, the late

*The names Bury, Gaer or Caer (pl. Carrow) ; also Cledh or Kledh, and Fos (pl. Fossow, Vossa), the last signifying Trench or Wall ; occur frequently in connexion with camps in Cornwall ; likewise the terms Dinas, Castle, Round or Rounds, Rings, &c.

With reference to the Bury Lane mentioned above, I was amused at its imaginary derivation as given by a Nanstallon woman, who told me she had heard that the camp had been an old war place, and the lane was named after a " General Bury who once commanded the troops there " (!). She added that several " antiquariums " had visited the spot.

†The name Tre-gaer (residence by the Camp or War-abode), is applied to the farm house close by. This name should have served to have kept in memory the associations of the locality. There are more than a dozen places so designated in Cornwall.

Rev. John Wallis,* Vicar of Bodmin, directed general attention to it, and he afterwards caused its position to be inserted in the Ordnance Map. Mac Lauchlan published a plan of it in 1847.†

Mr. Wallis took me to see it about 30 or more years ago, and when last I visited it, on May 2nd, 1883, Mr. Fowler the occupant of the land accompanied me. He said that his father had previously farmed it in succession to Mr. Solomon, both of whom had made discoveries in connection with the site.

The ramparts, he told me, were formerly very wide, sloping and overgrown, not like upright hedges. They had been reduced in thickness within living memory. There was a double rampart, he said, but now only a single one appears. The banks were excavated back from both faces towards their centre, thousands of cart-loads of earth and stone being removed to dress the fields enlarged by the digging.

He pointed out shallow pits or depressions in the ground, outside the camp, as places in which burials had been discovered. He said that barrows had been thence removed and, for the sake of obtaining their fertilizing contents, the earth had been somewhat scooped out beneath where they had stood. One barrow remained, much ploughed down, almost levelled by cultivation. I noted the situation of these spots:—

One (destroyed) was outside the middle of the north embankment.

A second (destroyed) was outside the eastern portion of the south embankment.

A third (destroyed) was outside the northern portion of the west embankment.

The fourth (the partially existing) was outside the western portion of the south embankment,

consequently there must have been two barrows on the south, one on each side of the entrance.

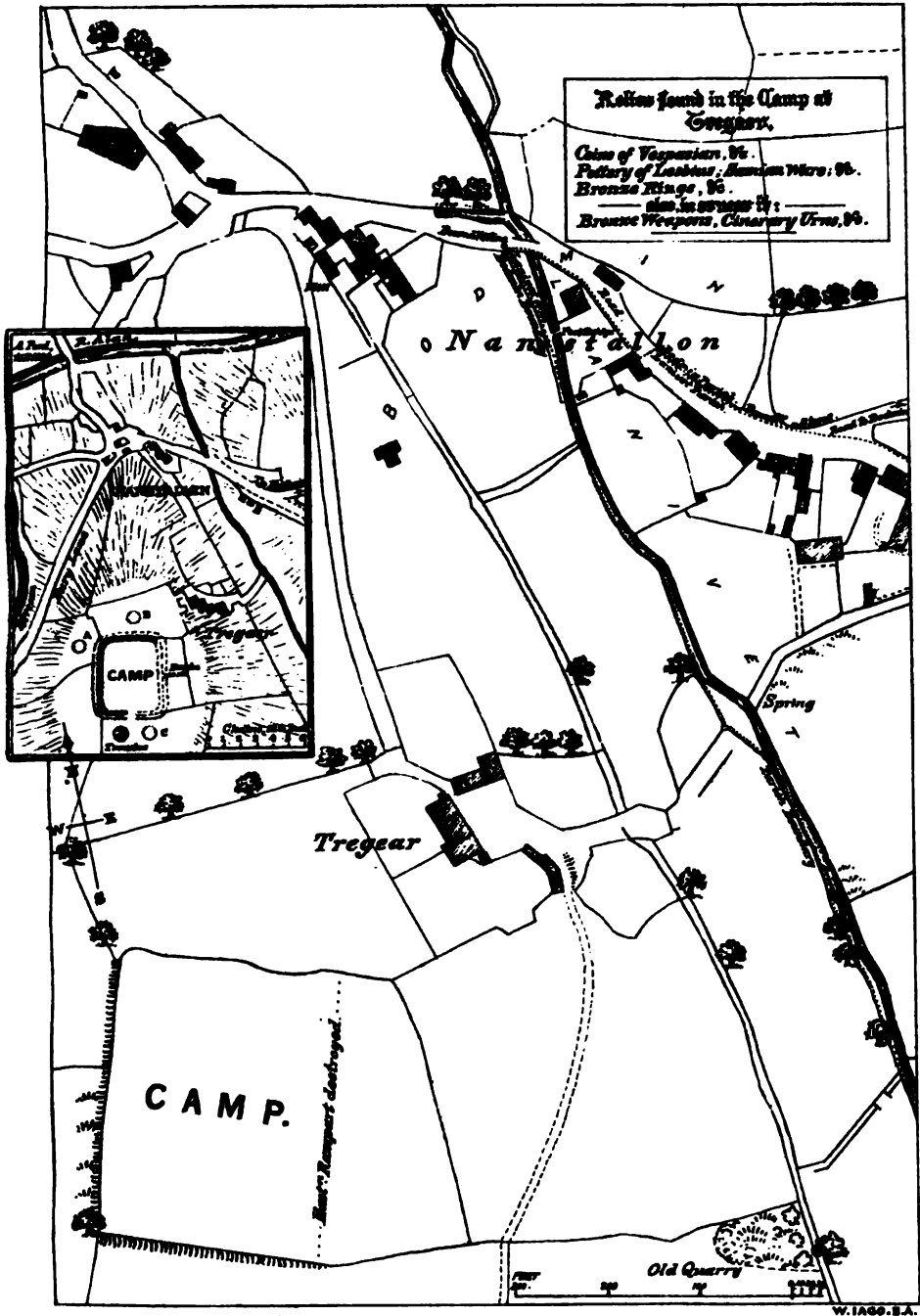
The farmer informed me that he intended to open this last tumulus when next the ground should be "not in crops," but I have not heard anything about it since. Perhaps this may be accounted for thus:—

*Wallis's Bodmin Register, pp. viii, 51, 404.

.. Cornwall Register, p. 19.

Cornwall Magazine, 1888, Vol. 3, p. 96.

†R.I. of C. Annual Report, 1849-50, pp. 21-3.



Roman Camp in N. Cornwall. (2. Plan).

From M. Lambell's plan, 1847, with addition of sites (A, B, C) of destroyed Barrows noted in 1888, 96 from Ordnance Survey 1884

The barrow, which I saw so much reduced in height, plainly appears in Mac Lauchlan's plan (1847), and he writes with regard to it and the sites of the others :—

“On the south side near the south-west angle there was, within recollection, a tumulus about 5 feet high, which was taken away for manure, and several holes have been dug for the same purpose where the ground appeared to have been enriched by some animal or other deposit. The tumulus was formed of stones, taken from the river apparently, and in the centre was a compartment containing some ashes, shewing it to have been a place of sepulture.”

I have already mentioned the finding of urns* at or near the camp, but whether British or Roman is unknown.

During 18 centuries Tregaer Camp has been tilled by more than 50 generations, therefore it is not surprising that the farmer should have picked up within its area (as he did, towards its northern side) a silver coin of Queen Elizabeth, dated 1593. Other articles of silver, one a sort of case, he told me, had previously been found, which he supposed had belonged to the Roman soldiery.

We must now refer to the “undoubtedly Roman” relics unearthed in the locality.

From Wallis we learn, putting his various accounts together, that this small Roman Camp (larger however than the one next to be described) was long regarded merely as a square field, the rampart, or part of it, having been thrown into the ditch. On digging out the gripe, as the part nearest the hedge is called, Roman urns of Samian fine red ware, ornamented with leaves, &c., with others of common clay of coarse mould, were found (and broken!), with coins of Vespasian, &c.

The fragments of pottery, with coins of Vespasian, Trajan, and others, picked up near the spot (the large brass coin of Trajan was found on the other side of the ford), passed into the possession of Mr. Flamank, proprietor of the estate, and the Rev. John Wallis.

*Ante, paragraph preceding Harlyn.

Mac Lauchlan, about 1847-9, wrote :—"The Rev. J. Wallis has lately seen some Roman pottery recently dug up at Tregaer with the* potter's mark upon it."

To these particulars it must be added that some of the relics were afterwards given to the Bodmin Museum, and so have become accessible to me for the illustration of this paper.

The following table of Roman and other objects found in Tregear camp, its vicinity and neighbourhood, is compiled from the foregoing statements, from memoranda in the Bodmin and Truro Museums, and from an inspection of such remains as I have been able, up to the present time, to trace :—

Objects.	Material, &c.	Where found.
COINS :— of <i>Vespasian</i> † (Roman Emp:) A.D. 70-79.	Silver	A Denarius was dug up at Trekillick, about a mile and quarter S.E. of Tregear Camp.
„ „	Bronze	In and near the camp.
„ <i>Trajan</i> (Roman Emp:) A.D. 98-117.	1 large brass	Across the ford.
„ Others [whether of earlier or later reigns not stated].	... ..	In and near the camp.
„ <i>Antoninus Pius</i> (Roman Emp:) A.D. 138-161.	1 first bronze	In Bodmin, 2 miles East of the camp.
<hr/>		
FIBULA, with pin	Silver (now lost?) ...	Supposed to be from camp or vicinity.
„ pin, only... ..	Bronze (curved), 2½-ins. long.	In or near the camp.

*See R.I.C. Annual Report, 1849-50, p. 22, and W. I.'s account in Proceedings Soc. of Antiquaries, London, 2nd Ser., Vol. 5, p. 487.

†C. S. Gilbert states (Vol. 2, p. 211). several ancient coins,—one of *Julius Cæsar*, another of *Vespasian*.—were dug out of the old foundation, whilst rebuilding a part of Bodmin Church in 1816, and were in the possession of Rev. W. Phillips. As Wallis (the Vicar) does not mention this discovery, perhaps Gilbert's is an erroneous account of the finds at Tregaer and Boscarne.

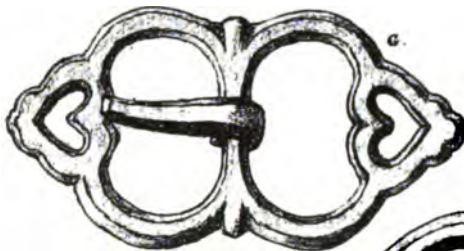
Coin of Vespasian; A.D. 70-79.

Bronze.

Silver.



Roman denarius found at Trillick, in
Lancashire. On the reverse the medals from it
project 7 heads of corn. (a token of plenty).



ALL REAL SIZE.

W1AG0

Bronze, &c, objects found in or near Tregear Camp, Bodmin.

A.B.C.D.E.F. said to have been found at or in the Camp. G.H. spot unknown. I, Bodmin. J.K. seen
the two last in a tin stream work. S is a very sharp bronze leaf, K. part perhaps of an ear-pendant

RINGS, (of fibulæ, belts or harness?)	1 bronze (inlaid), 1½-in. diam. 5/16-in. wide, ¼-in. thick. On front, or upper surface, 14 depressions like triangles or ivy-leaves filled with a hard dark substance.	} In the camp.
" " "	1 bronze (smooth). 1½-in. diam. ¼-in. wide & thick.	
" " "	1 bronze (flat and chamfered to sharp outer and inner edges, cut or filed, rough). 1½-in. diam. ¼-in. wide & thick.	
PENDANT	Bronze (small)	} From Flamank stream-work, Boscarne Moor, across the river.
TACK-STUD	Bronze (the head convex and circular)	
ARMLET or† CUIRASS (fragments)	Bronze (inlaid), 2 pieces,	} From a peat-bog, Bodmin.
SPEAR-HEAD‡... ..	Bronze (socketed and double looped) 4-in. long. ¾-in. wide.	
BLADE|| (spear, dagger, or knife)	Bronze (tanged), about 6-in. long beyond handles. ¾-in. wide at base. Tang ¼-in. wide. " ¾-in. thick. " 1½-in. long. Fine specimen (total length 7¼-in.) with midrib, concave bevels forming very sharp edges, end of tang a flat arc, sharp, for insertion in handle or staff.	} Supposed to be from the camp or its vicinity; (see Bodmin Mus. catalogue).

† So described, and styled Roman, in the Museum, Truro; the label (signed Murray) further states:—"the tin, which fills it, is connected with a chloride."

‡ Of same form as one found with burnt interment at Wilsford, Wilts, figured in *Archæologia*, 43, fig. 153, p. 447.

|| Compare with others in *Arch.* 43, p. 449. This one is long, straight-edged and tapering.

1. CELTS § :—Palstave	... Bronze (flanged, with rib and single loop). 5½-in. long. ¾ to 2¼-in. wide, and fairly thick.	} Dug up in Bodmin.
„ Socket-Celt	... Bronze (2 sides pierced for rivets, at about ¼ of length, no loop). About 5-in. long. 1 to 1¼-in. wide, and fairly thick.	
		} From tin stream work across river, opposite Cotton Wood, 1 mile from camp.

§ Both of these were exhibited at Somerset House, London, January, 1873, (Soc. of Antiq. Proceedings, 2nd Ser., Vol. v, p. 390, 392-5-6, 422, Bronze Exhibition), on which occasion Mr. Evans remarked :—"The best known form of tool met with in bronze is termed a celt. I use celt in preference to kelt because celt has nothing to do with the great Keltic or Celtic people, but is simply derived from the rather barbarous Latin, *celtis*, a chisel ;...a simple tool. There are various classes :

I. Flat or plain celts.

II. Flanged celts,—palstaves (from an Icelandic word) battering tools, axes, or spuds.

III. Socket-celts."

All three sorts here classed by Mr. Evans are found in Cornwall.

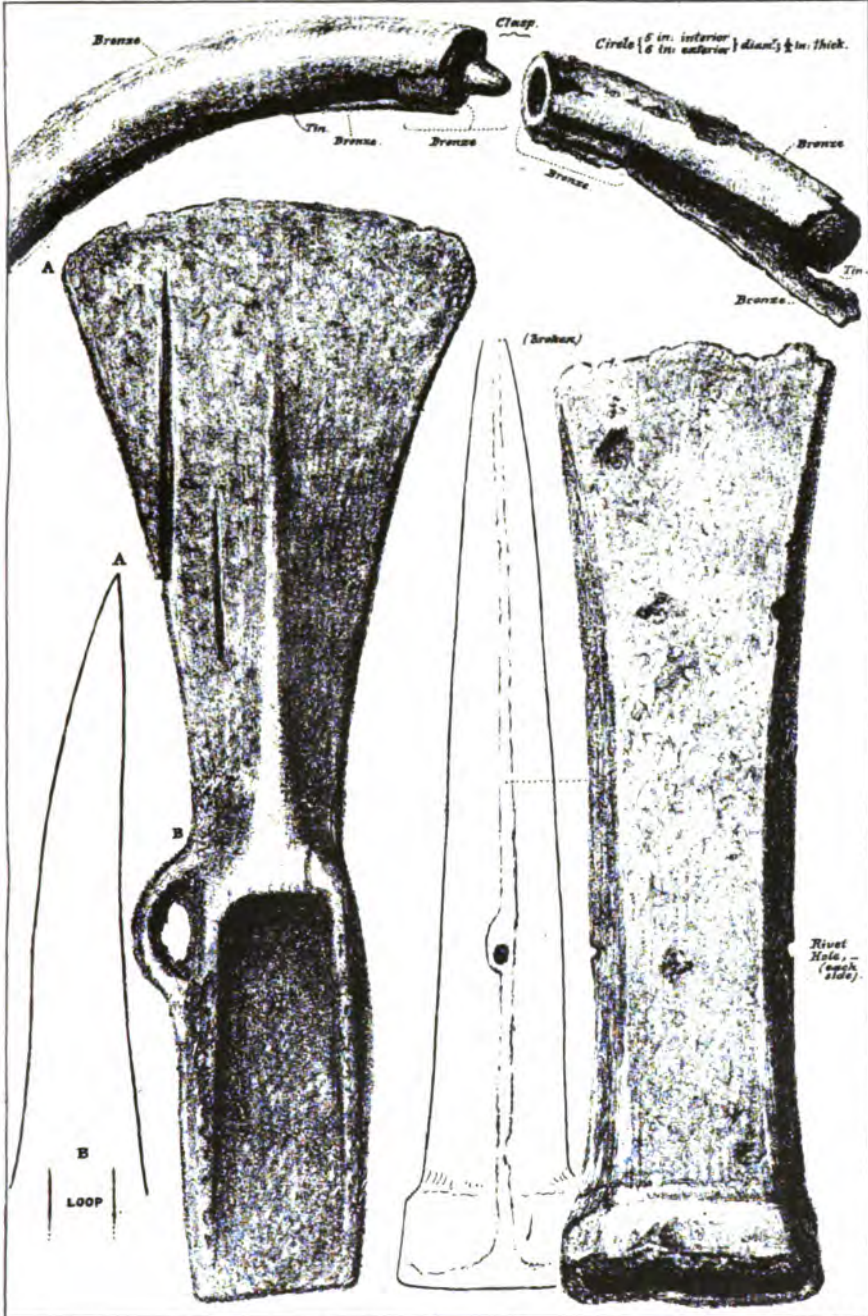
Sir J. Lubbock calls the 2nd form of celt, *paalstab* or *paalstave*. (Prehist. Times, p. 29).

Double-looped palstaves and socket-celts are very rare ; 2 of the former have occurred in Cornwall, and one of them is now in the British Museum, (Proc. Soc. Antiq. 2nd S. Vol. v, pp. 398, 400, 430, pl. 1, fig. 2). From the existence of copper and tin in Britain, and from the discovery of numerous moulds, &c., it seems that bronze implements were manufactured locally (see Thurnam and other writers). Celts were used during the Roman occupation (and perhaps much earlier), in Britain, both for peaceful and warlike purposes. They are found in mines, quarries, cultivated lands, burial places, and camps. They were not confined to Europe.

From Nineveh, destroyed 2500 years ago (7th cent. B.C.), a sculptured tablet has been brought displaying helmed-warriors digging down a city wall with bronze celts fixed on poles about 4-feet long (Yates, Archæol. Journ. Dec. '42 ; Bonomi's Nineveh, '52, p. 234), picks and crow-bars not being available. Some celts could be used without handles, others were attached to horn or wood in various positions for different purposes.

In Latin they are classed with axes and mattocks under the term *dolabra*, *dolabella*, (*dolo*) ; compare also the following :—*celtis* or *celtes*, old Latin for chisel, (*cælo cælo*) ; *kello* (Gr.), *cello*, (*celer*), to urge, impel ; and *culter* (*colo*, root *kol*),—whence *coulter*, *contean* ; cut, cultivate, &c. "*Si levaveris cultrum*" (Deut. xx, 25) ; "*celte sculpantur*" (Job xix, 24, Vulgate) ; "*malleolo et celte literatus silex*" (Gruter p. 329, anct. inscr. from Pola) ; "*celtis*,—*cælum sculptorum* (*laxuterion*, Gr.), *instrumentum aptum ad sculpendum*, *cisel Gallicæ dictum a celando*" (Ducange, &c.).

The spreading curve of a celt resembles a lily in outline ; the lotus was taken as a model for column capitals in Egypt, and Pliny (13, 17, 32) calls an African lotus "*celtis*," (see also *colocasia*). It is stated in Smith's Dic. Antiq. (p. 420) that celts were employed in making and destroying forts.



Bronze, Bodmin.

W. IAGO. B.A.

Strandet 1, from peat-bog; Pilestone, from Dr. Webb's garden; Scaled-axe, from opposite Cotton Wood; Bodmin.

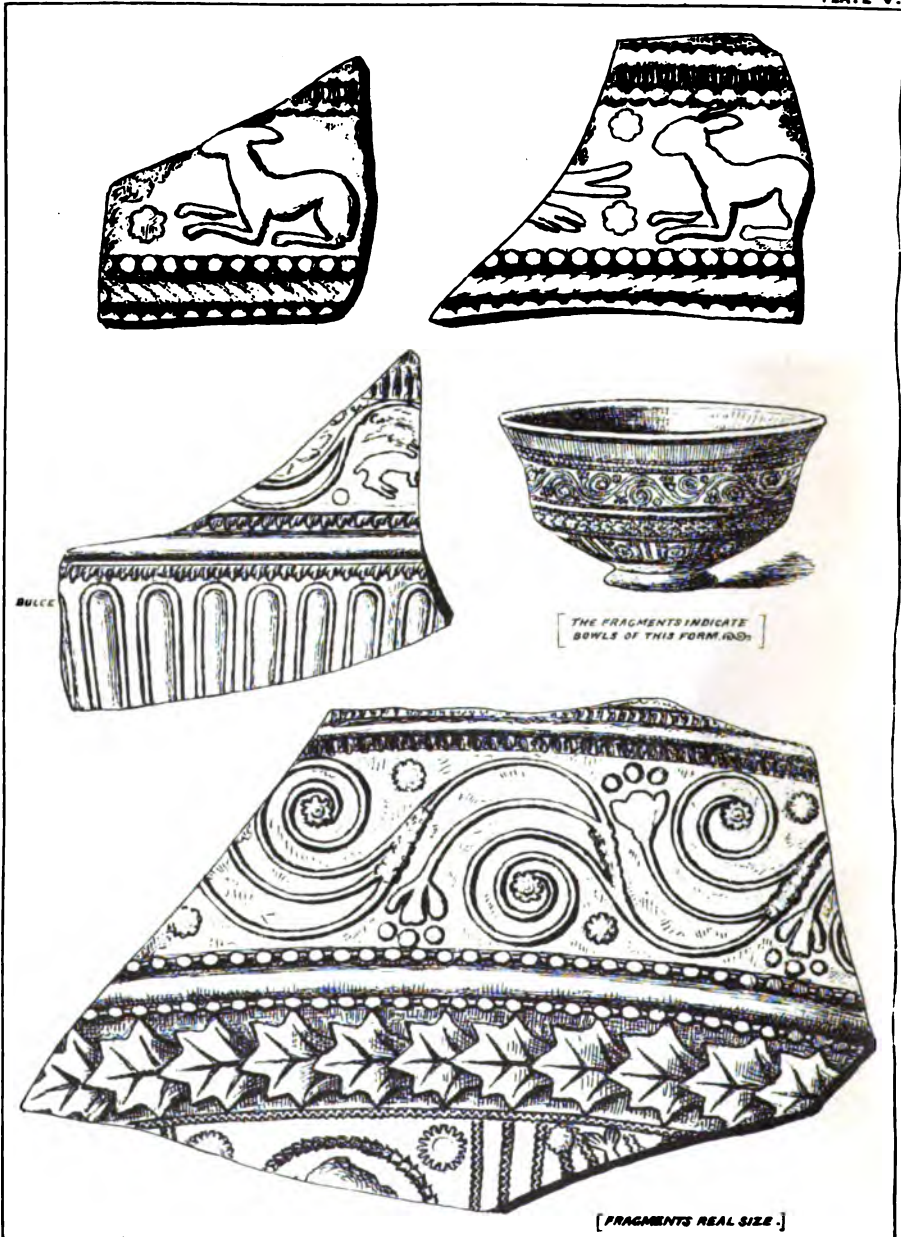
POTTERY:—Samian*	Vessels of fine quality, adorned in relief,† cast from moulds. Fragments of three upper and three lower portions of (perhaps five) elegant dishes or bowls, viz.—	Tregaer camp, and Boscarne stream works on opposite side of river.
„ „	1 patera or patella; three fragments; one piece displaying a band of overlapping vine leaves, running to left on bulge; dotted and other lines above; over them a band of flowering scrolls; below, rosettes and varied panels; [only two small fragments of circular foot remain; brim and bottom lost].	Dug out from the gripe of the camp.
	Height of vessel [probably 4½-ins.]	
	Diam. at mouth [probably 9-ins.]	
	Exterior diam. at bulge, 8-ins.	
	Exterior diam. of foot, 3-ins.	
	Depth of foot, ½-in.	
„ „	1 ditto; two small fragments; —above bulge, dotted and other lines enclose a band of crouching hares and fork-tailed birds placed alternately, all looking to the left and separated from each other by vertical pairs of rosettes; [remainder of ornament lost]; size of vessel, apparently same as above, but band rather narrower.	Taken from stream work (Lander's?) Boscarne.

* There were Roman potteries in Britain, in Gaul and elsewhere. Many places (such as Nola, &c.), were famous for beautiful fictile productions, but three were distinguished above all others for the extent and excellence of the manufacture:—1, Samos; 2, Athens; 3, Etruria. Samian ware, Pliny states, was exported “to every nation under heaven,” and Wheatly (Pottery, p. 10) writes that it is “found wherever the Romans settled.”

† The raised designs were not formed by the addition of slip, as in Durobri-vian or Castor ware manufactured in this country in imitation of Samian, (see Jewitt's G. Mounds, p. 154). There is a considerable difference between that from Samos and that made probably in Britain (Wheatly, p. 11).

POTTERY :—Samian ware (red, glazed)	1 ditto; one fragment; from bulge downward a vertical round-headed fluted design, fimbriated; dotted and other lines above; over which a band of scrolls, with small hares [&c.?] looking to the right. The band is narrower than those in similar position described above. The glaze is of somewhat deeper red. [All other parts of vessel lost]. Size, same as foregoing or perhaps rather less.	Tregaer or Boscarné.
„ „	Another circular foot of a patella; Diameter 3-in. Depth $\frac{1}{4}$ -in. A potter's stamp (almost illegible from injury) is impressed on the bottom of the interior of the vessel, within a central circle. The letters seem to resemble:— I V N I I O for "Junii officina,"—from the laboratory of Junius.* Length of stamp, $\frac{7}{8}$ -in. Height of letters, $\frac{1}{8}$ in.	„ „
„ „	A third circular patella-foot; fragment; Diam. of foot 3-ins. Depth „ $\frac{3}{8}$ -in. A small portion of the potter's stamp remains within central circle inside vessel; only one letter can be read. ...V...its height, $\frac{1}{4}$ -in.	„ „
„ „	Fragment, with glaze on one side, measuring only $1\frac{1}{4}$ by 1 by $\frac{3}{8}$ -in.	Lander's stream-work, Boscarné.

* After determining that this was most probably the reading, I noticed instances of very similar legends on potters' stamps. Professor Hübner has given the following, in his *Corpus* (Inscr. Brit. Lat.):—At Cricklade, Kent, "in patellis quatuor formarum diversarum, I V N I I O (Junius);" at Cambridge, in Clare Hall Library, from Litlington, s. I V N I I O; at Cærsars, Montgomeryshire, "intra in circulo scriptum I V N O; potest legi Jun[ii] o[fficina] sed lectio incerta est." This last remark will equally apply to the reading I have given above,



Excavated Red Samian Pottery from Tregear Roman Camp, Bodmin.

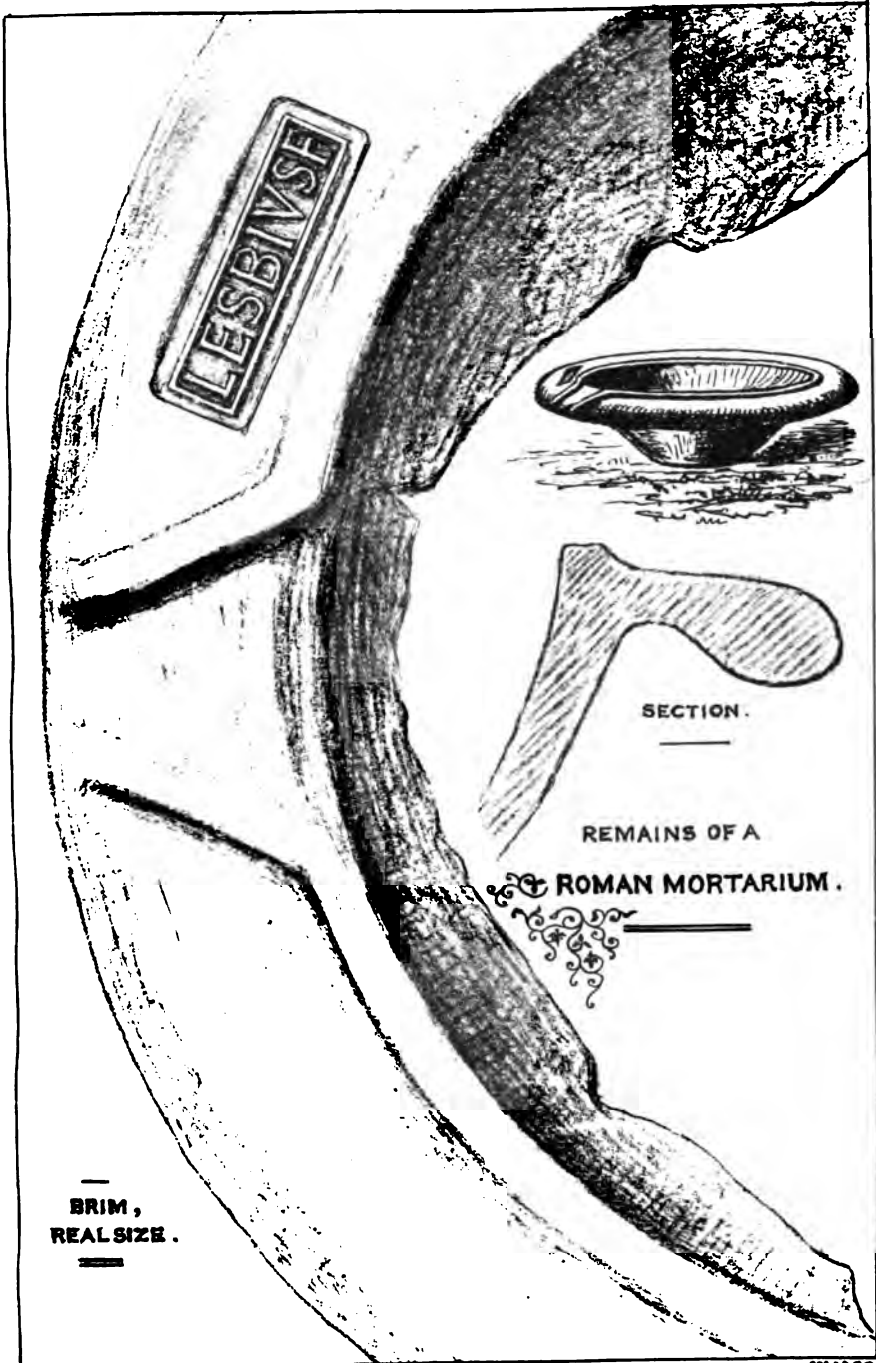
W. 1120. 11A.

- POTTERY : — Red, 1 urna or olla,—urn or jar ; Stream-work,
unglazed). fragment of bottom and Boscarne.
side; fine clay, boldly curved.
Height of vessel [probably
about 8-in.]
Diam. of circular base 3-in.
-
- POTTERY : — (Drab, 1 or more, ditto ; in fragments ; Found it is
brownish, yellow- dusky brownish, smooth ; supposed in or near
ish, and dusky, and of darker tint, coarser ; the camp or stream
unglazed). all of similar size and form. works.
Height of vessel or vessels
[probably about 7-in.]
Width at mouth, about
5½-in.
Diam. at base, 3½-in.
(Perhaps small sepulchral
urns).
- „ „ 1 mortarium ; brim fragment ; At Tregaer, in
drab, with slight reddish camp or in vicinity ;
coating like a wash, on sur- if this be the piece
face, nearly worn off. of Roman ware (as
The brim is rounded and it is supposed to be)
has a rim led forward to mentioned by Mac
form a lip. Lauchlan as im-
Height of vessel, [prob- pressed with the
ably about 3½-in.] potter's stamp.
Exterior diam. at brim,
10½-ins.
Interior diam. at brim,
7½-ins.
Width of brim, 1½-ins.
„ „ rim, ½-in.
„ „ lip, 1¼-in. to ¼-in.
Diam. of base [probably
3½-in.]
Along upon the brim,
beside the lip, is the
potter's stamp, perfect, with
the heads of the letters
outward :
- LESBIVS F
- “Lesbius f[ecit].”—Lesbius*
made it.
Length of impression,
1½-in.
Width of impression, ¾-in.
Height of letters, ⅜/10-in.

* The name of Lesbius, does not occur on any of the potters' stamps, nor indeed in any of the thousands of other inscriptions, quoted by Professor Hübner in his great work “*Inscriptiones Britannicæ Latine*.” It is of good and clear type, and evidently gives the potter's cognomen. Many families of potters have

POTTERY : — (Drab, brownish, yellowish, and dusky, unglazed).	1 ditto; brim-fragment; drab, yellowish tinge. Exterior diameter about 13½-in. Width of brim, 2-ins.	Tregaer or Boscarne.
" "	1 ditto; base-fragment; drab, reddish tinge. Diam. 5½-ins. Thickness, ⅝ to ¾-in.	" "
" "	1 side-fragment of large vessel; drab coarse clay. Thickness, ¾-in.	" "
" "	1 brim-fragment; drab clay. Thickness, 1¼-in.	" "
" "	1 ditto; mouth of small thick bowl or of a necked-vessel; buff colored soft clay. Exterior diam. of brim, 5-ins. Interior diam. of brim, 3½-ins. Thickness, about ⅝-in.	" "
" "	1 ditto; mouth of a small necked vessel grooved around within; bright buff colored clay. Exterior diam. of brim, about 2-in. Interior diam. of neck, about 1-in. 1 part of handle of same (?), the piece being 2½-in. long.	" "
" "	2 handle-stumps on fragments of neck of large vessel; amphora (?); drab coarse clay. Thickness of handle, from 1¼ to 1½-in. Thickness of side, ⅝-in.	" "

been traced by stamps of a similar class. "The Lesbian,"—this name brings before us associations connected with the islands which one after another fell under the Roman sway. Lesbos (Mytilene) the largest and most important off the west coast of Asia Minor was an island of note, and like Samos a little further to the south, gave its name to persons, precious materials, arts and pottery. We have already described Samian ware. Lesbian may be thus defined:—fictilia decorated in relief by means of engraved-work invented by the Lesbians; "Lesbium genus vasis cœlati a Lesbis inventum" (Festus). The Mortarium,—the brim of which is before us, stamped by Lesbios,—does not seem to be of Lesbian ware, technically so called.



From Greaser Roman Camp, Donstallan, Bodmin.

POTTERY :— (Drab, 1 handle fragment; concave brownish, yellowish, and dusky, unglazed.	along face, with wavy margin, and pits(3) produced by end of stick*; bluish grey, stony looking, with much mica.	" "
" "	[Besides the fragmentary clay vessels, mentioned above, found at or near Tregaer, there is an entire urn or small mouthed jar in the collection, which has the appearance of being Roman, but where it was found is doubtful.	" "
An entry in the Bodmin Museum catalogue refers to an ancient urn discovered between two old houses in the town, and this may be the same].		
GLASS :—	A bead†; opaque blue-green; resembling green bronze, and at first sight mistaken for it; corrugated with 17 ribs parallel to the bore. Length, $\frac{5}{8}$ -in. Diam. $\frac{1}{4}$ -in. Diam. of bore, $\frac{1}{8}$ -in.	Supposed to belong to same collection.
	Piece of black glass [now lost] found with Roman pottery and deposited with same in Bodmin Museum.	Taken from Lander's tin stream work, Boscarne, when first worked by him in 1849.
STONE Vessel:—	A pebble; circular, and somewhat flat but rounded every way; hollowed out to form a little bowl.‡ Exterior diam., $1\frac{1}{4}$ -in. Interior " 1-in. Height, $\frac{1}{2}$ -in.	Supposed to be from same neighbourhood as the other relics.

*Resembles Roman ware made in some parts of Britain.—Upchurch ware, &c.; compare it also with handle of the great pitcher (given by me to the Museum at Truro) which was found full of tin in a stream-work in the neighbourhood of Lanivet, not far from Tregaer.

† One of exactly the same form is shewn by Jewitt (G. Mounds, fig. 296, p. 186), who writes respecting it:—Beads are perhaps the most frequently found of any remains of Roman glass.

‡ About the size of a British "incense-cup." Bowls of stone (sometimes of granite) occur in many localities. In Cornwall several have been found. Dr. Borlase gives sections, &c. of three stone pateræ turned on lathe, (Antiq. pl. xxxi). On the continent the Romans had pot-stone turned into cooking vessels.

STONE Mullers :—	2 quern stones of rudely rounded form; each a pierced upper one, for grinding corn by hand; granite.	Discovered in excavating at Boscarne.
	Dimensions of A. Height, 5½-in. Diam., 11 to 13½-in. „ of hole, 2 to 5-in.	
	Dimensions of B. Height, 5-in. Diam., 11½ to 12½-in. „ of hole, 2-in.	

MISCELLANEOUS
Relics, &c.

A gold* fish hook [now lost] of unknown age; grains of native gold,* pebbles of wood tin; ancient clay pipes and shoe, with Roman pottery, and a tinner's shovel of oak (this last 18 feet under surface).

The first, found at Corks, a mile and half from Tregaer; the remainder in the stream-works of Boscarne.

From an examination of these remains (which have now for the first time been described in detail) discovered in Tregaer camp and its vicinity, it will be seen that the fort was constructed by Roman troops in or about the first century of our era, in the midst of an important British tin district.

Whether the troops came from the north or south coast we shall presently consider, also their number and the object of their halt.

First we will offer a few observations on the articles found. The coins, the impressed pottery, and some of the bronze relics are clearly Roman, but the granite mill-stones and some of the bronze weapons and implements may be British.

Roman troops carried mullers with them amongst their impedimenta on beasts of burden; these corn-grinding hand-stones may therefore have been theirs, and after the owners had quitted the camp the querns and pottery left behind may have

* Gold is found in the tin stream works of this locality, as well as in other parts of Cornwall, and an inhabitant of Bodmin had a ring made of Nanstallon or Boscarne gold. C. S. Gilbert (Survey, vol. 1, p. 215) gives an interesting account of gold finding in Cornwall, and of several articles made of the Cornish gold. See also the remarks of Dr. Borlase, Mr. Henwood, and other authorities on this subject.

been carried off to Boscarne, to be dug up there in our own day; but more probably they were those made and used by the Britons of Boscarne.

Amongst the articles contributed to the Bodmin museum from the district, a silver pin for fastening the toga is mentioned. I cannot trace this, but there is a light-colored bronze fibula with pin, which may be the one intended and wrongly described as to material. It is of buckle-form with heart-shaped openings.

The armlet mentioned in the list is curious, and may be seen in the museum at Truro. In what peat-bog of Bodmin it was found, the late Rev. J. W. Murray has not stated in the label. He has styled the object Roman, but it may be British. Two fragments, forming about one-half of the ring and the fastening, remain. The surface is plainly rounded. The exterior diameter of the circle is about 6 inches, the interior diameter 5-inches. It could therefore have been worn on the arm, leg, or around the neck of a man. If part of a cuirass, it must have been attached at the shoulder so as to form a rim for the arm-hole, or else it encircled the throat; but there are no marks of attachment.

It consists of a pipe or thin skin of bronze, $\frac{1}{4}$ -inch in diameter, with a bronze block, $\frac{2}{3}$ of an inch long and fitting the bore, inserted at each end. One of these blocks has a point, the other a hole or socket; together they form a rude clasp or catch. The remainder of the tube is filled with solid tin, melted and run in.

The bronze covering is slightly open all along its inner circumference, displaying the tin; the opening having probably been caused by the oxidizing and consequent expansion of the inner metal. The bronze in colour resembles dull gold, the tin appears black, but when scraped with a knife both metals become quite bright. The bronze is hard and springy, not flexible,—this is an evidence of its being antique.

The bronze tanged-blade and socket-celt have both been broken at point, and the palstab has received two sharp cuts on its face from some other tool or weapon.

The coins that I have seen are indistinct on their reverses, with the exception of the silver one found at Trekillick, in Mr. Baron's possession. That denarius displays the head and legend of Vespasian on the obverse, and upon the reverse, the modius or corn-measure with 7 ears or heads of corn issuant therefrom, —an emblem of plenty.

The beautiful pieces of Samian pottery found in the camp and stream-works are very fragmentary, but this is not surprising, for not only did the finders break some of them, but the ware was proverbially brittle :—" *Scis tu ut confringi vas cito Samium solet* " wrote Plautus, who died B.C. 184.

That Roman camps contain so few entire objects of interest is accounted for by the fact that the soldiery when abandoning a station destroyed by breaking or burning whatever they had to leave behind likely to prove useful to an enemy.

The tinner's oaken shovel dug up at Boscarne is not much unlike those found in other stream-works, but it has such a very ancient appearance that one can suppose it was used by either a British or Roman tin-streamer in the days when Tregaer was garrisoned.

If we ask who were the Roman soldiers who came to this locality, we must recollect that under the Republic the legions were composed of citizens who had a substantial qualification in Italy, but afterwards, under the Empire, colonial and foreign enlistments were also sanctioned and citizenship was extended. Roman soldiers were trained to great endurance, picked veterans of twenty-years' service were both pensioned and encouraged still to serve, their duties being somewhat lightened, but their responsibility increased. Such legionaries as had the heaviest duties to perform must needs have been men of strength. Crested helm of bronze, cuirass, greave, bossed shield, javelins, sword and dagger, were not all that they had to bear, but, when on a long march, provisions for at least a fortnight, 3 or 4 stakes for camp palisades, certain articles of kit and various tools had to be carried. Josephus who saw the troops of Vespasian, describes the arms, &c., of the infantry, and states that each man had, in addition, a saw, basket, mattock, hatchet, strap, hook, and chain, also 3 days' provisions; so he says they differed little from mules of burden. One eminent commander,

we are told, trained each of his men to carry food for 30 days, and 7 stakes,—twice the usual number. A pot, reap hook, and 12 stakes, &c., have also been mentioned. The usual weight was 60-lbs. exclusive of armour. Cavalry were not so heavily burdened.

Detachments of the army generally consisted of both horse and foot.

Beyond the details of their varied equipment, there is much to interest the student in their military discipline, the regulations relating to their parades, drill and other duties, their methods of marching, keeping guard, their *tesseræ*, watch-words, trumpet-signals, engines used for artillery, &c.; but on these we cannot now enter.

With regard to their Camps, the rules as to shape and proportion were precise. After they had abandoned the square form, they made them like the one we have been describing at Tregaer, oblong with the corners rounded off, and with about $\frac{1}{2}$ more length than breadth. The size of ditch and rampart, the position of the commander's tent and the tents of his staff, the various openings in the intrenchments, the spaces within to be specially kept clear, or encamped upon, were all fixed by rule and settled by the camp measurers. Much of this being known, we are enabled to estimate how many men could be quartered at Tregear Camp. It seems to have had only one entrance:—the "*porta decumana*," in the rear.

Allowing a sufficient space for the *Prætorium*, and for the intersecting ways called *Principia* and *Quintana* (whence the modern word canteen), and also a sufficient *Intervallum*, &c., we find that a Cohort which (under the Empire) consisted of 480 men, and also, perhaps, a troop of 30 cavalry, could have been quartered in Tregear. Some provincial cohorts had no cavalry attached to them.

To illustrate the matter briefly, we may state that a Roman Legion (at the period to which we are alluding) consisted of 5280 men, and there were supplementals besides. In a Legion there were 10 Cohorts:—the first, twice as great as either of the other nine. To that one was entrusted the eagle of the legion, its men numbering 960. Each of the other cohorts contained 480 men.

All maniples, bands or divisions of a legion had their separate standards under which to fight. 2 cohorts made a maniple.

The chief commanding officers of a Legion (under the emperors, consuls, or commanders in chief) were Tribunes.

The chief officer of a Cohort stationed at Tregaer would be either a Tribune or a senior Centurion. He would be attended by a staff, an apparitor and others. In a Cohort were 6 Centurions or Captains, each in charge of 80 men (100 in theory, hence the name).

The Centurions were of different grades. There were also junior officers,—lieutenants (called Options), &c. The commander of a troop of horse was a Decurion, and he had subordinate officers. Troops of foreign horse (Celts, &c.) were made use of, besides regular cavalry. There were mounted scouts, archers, and slingers.

When encamping, according to Legionary rule, each centurion with his 80 infantry would occupy 3600 square feet of ground, *i.e.*, an area which would contain 10 ordinary tents (to hold 8 men each) with spaces for baggage, piling arms, &c. If the tents were in single line, the ground of the century would measure 120 by 30 feet.

Each centurion was allowed for his tent as much ground as would pertain to two of the tents of his associated men, but any consequent overcrowding of the men's tents was counteracted by the absence of quaternions on watch, leaving 8 men in each of their 8 remaining tents. A dragoon and his horse occupied a space equal to that allotted to 4 foot soldiers.

It is upon these data that I have reckoned accommodation for a Cohort, with additions, in the camp of Tregaer.

Some writers have stated that under certain circumstances the Romans made their men occupy less than the regulation space. It is also said that in the later period of the empire the camps were made to conform to the nature of the ground, even if they had to be circular. Tregaer camp is not affected by this.

If all the circular camps in the neighbourhood existed when it was formed, and were well garrisoned by the Britons, the

Romans at Tregaer would need to be in fair force. The camps around are very extensive as well as numerous, and are spread across the country in every direction.

Those nearest to Tregaer are Castle Canyke or Kernick, Dunmere, Pencarrow, and Killibury or Kelly Rounds, on the east and north; Castle-an-Dinas, Dennis, &c., and Castle Dor, on the west and south.

But perhaps this Roman camp was not so isolated as we have hitherto been led to suppose,—for, other entrenchments, of similar form apparently, have somewhat recently been traced in the neighbourhood. These may have been constructed by the same troops that occupied Tregaer, or by supporting cohorts. We do not know whether there was, in or about the first century, a complete legion stationed in Cornwall, but the name “*Sebasta altera legio*” has been applied to Liskeard* (13 or 14 miles to the east of Tregaer), and upon the silver goblet belonging to the corporation of that Borough the word “*Legio*” is engraved. A legion may therefore have been in occupation of this region.

The quadrilateral earthworks recently noticed, however, are in a direct line between Tregaer camp (at Nanstallon) and Port Isaac (on the coast), 9 miles off, as the crow flies, almost due north, and the intrenchments are near each other.

From the shape of the camps, by their proximity to circular earthworks, and from a comparison of them and of their positions with others like them, in the Tregony, the Looe, and other districts, I am inclined to believe that Roman troops from time to time advanced into the heart of Cornwall from the sea coasts and intrenched themselves close to British strongholds which they desired either to capture or over-awe. The present case

* Wright’s court-hand (1815) with appendix of ancient names of places compiled from Antoninus, &c., &c., p. 34.

“Roman name of Liskeard as given in several Latin Dictionaries,” *History of Cornwall, Lake, Truro*, (1870), Vol. 3, p. 149.

Lis,—a court or palace; *Caer*, *Kaer*, *gaer*,—as in Tregaer, place of war. *Castrum*,—a castle; *Castra* (pl.) camp or barracks. Perhaps the Castle or Court of the Earl of Cornwall at Liskeard was built upon the site of a Roman earth-work,—head quarters camp; and the stones with Latin inscription, in raised letters, *OLIM MARTI N...&c....* ..[*COH?*] *ORTEM...&c.* may have been cut for some commemorative purpose at a later period, with allusions to old associations.

supports this view. That the camps, British and Roman, were not mere police stations seems to be evident from their martial appellations, the term war-place being connected with so many of them. The numerous tumuli, in and around them, are also grim indications of fighting with loss of life, and this might naturally have been expected.

A garrisoned camp in the vicinity of mines may have exercised a controlling influence over the natives, and been the means of preserving order and preventing robbery, but in keeping order, protecting trade, and obtaining supplies, the soldiers in a country not their own were probably more of warriors than peace officers.

In tracing the origin of Hundreds and Tithings, Mr. Coote has observed that the "*Milites Stationarii**" of the Romans,—(the military on police duty), have not sufficiently attracted the attention of archæologists. He points out that Kellermann has not mentioned them, although his work treats of every other form of soldiery under the Roman empire; that Cardinali, Grotefend, Zell, and Dr. Smith are also silent with regard to them,—the last named, in his *Classical Dictionary*, giving as outlying stations only those which were purely martial or fiscal.

The *Milites Stationarii* were no part of the ancient constitution of Rome but owed their origin to Augustus. That emperor posted "*stationes*" with officers and men in opportune places to restrain armed robbers, thus instituting police and police magistrates, the latter being the centurions in command. The *stationarii* acted both as soldiers and police. In the investigation of a charge the suspected person was arrested, searched and interrogated, the rack being used when ordinary persuasion failed.

Thieves, fugitive slaves, Christians, &c., were thus brought to account, before the centurions, who either discharged them or committed them for trial and prosecuted them. The *stationarii* were generally placed in centres of population and for the most part were quartered in towns under Roman sway.

* *Archæologia*, Vol. 44, p. 299. H. C. Coote, F.S.A., 1872.

But we must now resume our account of the Roman camps between Port Isaac and Tregaer.

Their being found in this locality agrees with the other evidence which we now possess of the Romans having had a hold on the north as well as on the south of Cornwall,

From Stratton, with Bude as its sea-port, down to Tintagel, and on to Padstow Harbour, by way of the Plain Street, the Romans carried on a traffic of which we have distinct traces,—whether they acted as conquerors, traders, or both.

On the coast, a little to the north-east of the Padstow estuary, are three small ports very close together,—Port Quin, Port Isaac, and Port Gaverne. A stream comes down to each. The land adjacent (now St. Minver and Endellion) is famous for its suitability to the cultivation of corn. Grain near the coast, and tin further inland, would probably attract the Romans to the locality. It is even thought that the name of Port Isaac* was suggestive and inviting to those who could understand Cornish, or get it interpreted.

The Roman station (near Rock and Bray Hill, in St. Minver) was only five miles distant from this place.

We will now describe the situation of the camps, by reference to the Ordnance map, (which see):—

Port Gaverne and Port Isaac, side by side, are less than half-a-mile apart.

Two miles up the Port Gaverne valley, just beyond the source of its stream, is a fine circular British earthwork, Tregaer in St. Kew.

A mile and half up the Port Isaac valley, beyond the head of its stream is a parallel-sided [Roman?] camp, at Trevinick, also in St. Kew.

* Probably "Corn-Port." Isaac seems to be a corruption of some Cornish term. Compare:—Eys, ys, is, iz,—“Corn;”ic, an adjectival termination, signifying “connected with;” isa,—lowest; gwic, wic,—village or creek; idzhec,—sounding, resounding, hooting. See Borlase, Pryce, Williams, Bannister, &c. The derivation and meaning of Port or Porth are well known. Maclean gives the name of this place as Port-Isaac or Port-issick. (The names of St. Illic, Elente, Endellion, or Teilo, probably do not enter into it). Most likely then Port-izic signifies Corny-port, the cove in which ships could obtain a good supply of grain.

These two camps, the round and the square, command the two ports mentioned, in Endellion, and are not more than a mile and half from each other on the south side of the great North Coast road which runs down from Stratton to the Roman station by Padstow.

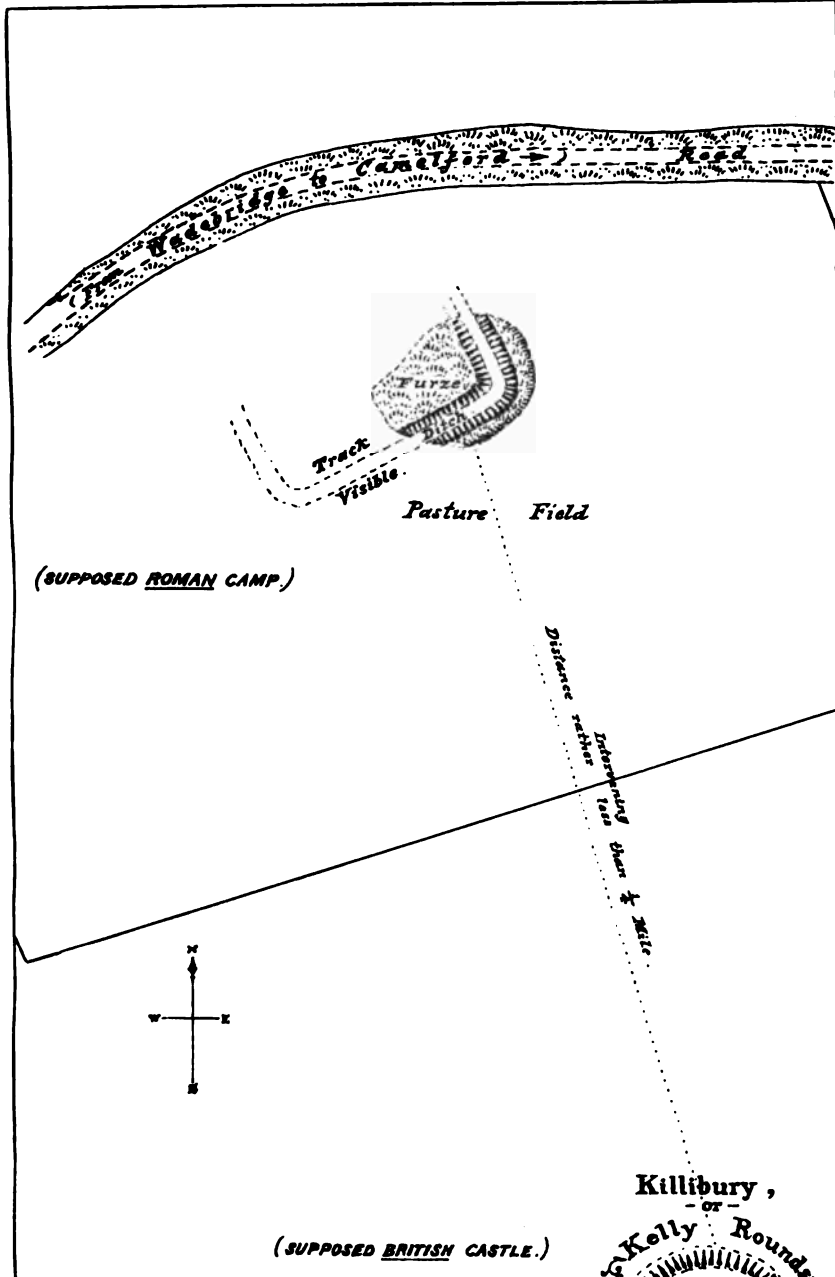
Sir John Maclean,* (to abridge his account slightly), thus refers to the straight-sided camp, which seems to have been a thorn in the side of its round neighbour the British Tregaer, but at a safe distance from it:—

“Close to a road in a field on the farm of Trevinick, are the remains of a quadrangular encampment measuring about 100 yards on each side, nearly levelled by agricultural operations, but very clearly defined on the northern and eastern sides.

Pieces of swords in a very advanced state of decay have been found in great quantities in ploughing the field. It has never been ploughed very deep. We do not learn that coins or pottery have been noticed. Nevertheless we are disposed to give to this work a far higher antiquity than has been ascribed to it.” [viz: that it was a military post during the 17th century civil war.]—“Its position close to the great road leading to the Roman settlement, which undoubtedly existed in St. Minver, seems to point it out as Roman. Human remains have not unfrequently been found. It may have been occupied in the civil war [as other ancient earthworks were], though we are not aware that any engagement in the neighbourhood has been mentioned in the history of the period. Such occupation however would not be inconsistent with the higher antiquity we claim for this work.”

Here then, just inside Port Isaac, we have this camp made (as Sir John considers) by the Romans. They probably landed at that port, if they did not come along by the coast road. This camp “shadowed” that of the Britons which headed the next creek, and, as “broken swords” have been found “in great quantities,” it seems there must have been a battle close to the Roman work. The Britons of Tregaer, St. Kew, probably attacked the new comers.

* History of Trigg Minor, Vol. 2, p. 80.



According to the dimensions given by Maclean, this fort must have been in size very similar to the Roman camp at Tregaer by Nanstallon, and would therefore have held the Cohort of 480 (or more) men.

The next camp of the same form was pointed out to me by one of the Ordnance surveyors. It is 3 miles further inland, and is nestled unseen close to the next great British earthwork, Castle Killibury or Kelly Rounds. To reach this spot, from Trevinick, a river had to be crossed. This was accomplished at Amble, and the spot is named in Romano-British fashion Penpont.*

Corporal Frederick West, R.E., thus described the camp to me when he surveyed it in 1879,—at the same time enclosing a tracing of its plan, which shews its corners rounded off:—

“The ancient camp is almost north of Kelly Rounds. It consists of the eastern angle, which is rectangular, ditch about 10 feet wide, and banks which are very steep. One can trace the ditch by a slight ridge going westward. I should imagine that the camp was extensive and square; if so the road from Wadebridge to Cameiford would occasion the destruction of the northern part of it.

Mr. Grose of Wadebridge told me he could recollect the remains much more extensive, and added, that much of it had quite recently been levelled. It is only $\frac{2}{3}$ of a mile north of Kelly Rounds, and, though so near, it cannot be seen from them. It commands a most extensive view northward. I should think the remains could never have formed an advanced trench to Kelly Rounds, or have been in any way connected with that formidable defence, but was rather thrown up as near as possible in order to facilitate attack.”

From the drawing, accompanying his description, the work appears to have been similar, in form and size, to the two other quadrate camps near, and therefore, like them, it could have contained the cohort.

Supposing that the troops intrenched in it succeeded in subduing the Britons in Kelly Rounds, they could then have marched $4\frac{1}{2}$ miles further inland on their southern course, and

* Pons, (Lat.)—bridge, whence Pont, which became part of Cornish language.

established themselves at Tregaer, Nanstallon, where they were in possession of the ford of the river Alan, leading to Boscarne, and were able to control the tin-streamers.

Assuming that this was their line of invasion, or exploration, and that they halted at Tregaer for some considerable time (as seems likely from the numerous interments around the camp, and from the many fragments of Samian-ware left in and near it), we may thus summarize the halting places, and their straight line distances from each other :—

From Port Isaac, landing place, to Trevinick Roman camp, (near the British Round Castle of Tregaer in St. Kew) :— } $1\frac{1}{2}$ miles.

From Trevinick Roman camp to Kelly Roman camp, (near the British Rounds of Castle Killibury, reached *viâ* Penpont) :— } 3 miles.

From Kelly Roman Camp to Tregaer Roman camp, Nanstallon, (*viâ* Denham's Bridge, Pencarrow, and Boscarne) :— } $4\frac{1}{2}$ miles.

Total distance, Port Isaac to Tregaer, at Nanstallon :—9 miles.

Not allowing for extra distances caused by deviation.

The military force would thus have penetrated from a port on the north coast to the centre of Cornwall,—Tregaer, as we have stated, being in what is now Bodmin Parish,—midway between the harbours of Padstow on the north and Fowey on the south.

Measuring each way in a direct line, Bodmin itself is 10 miles from the sea on both the north and south coasts.

We will not attempt to follow "the cohort" further.

After a protracted halt at Tregaer, the troops may have returned to the place whence they started, or they may have crossed the mainland of Cornwall and taken shipping on the south. Dr. Borlase rightly or wrongly supposed that he could trace part of a Roman road between Bodmin and Lostwithiel, which would lead in the Fowey direction, but I have not observed any appearance of quadrilateral camps in the Lostwithiel and Fowey district. There are a few circular castles there, supposed to be British, and the Giant's Hedge [Roman?] from Lerrin to Looe.

We have now shewn that a chain of Roman camps as well as British, extended from the north coast to Bodmin, and it seems there were others along that coast. Dr Borlase considered that Binamy Castle, close to Stratton, a quadrilateral moated structure, which belonged to the Blanchminsters, was of Roman work originally, and he learnt that silver and small brass coins had been found there. He also called Walesborow or Wallsbarrow a square fort, a mile and half south of Bude. Moreover, 4 miles further south, and 12 from the Roman stone at Tintagel (yet to be described), is a four-sided intrenchment, conspicuously shewn in the Ordnance Map, and thus noticed* elsewhere:—

“Ashbury (in Week St. Mary), is the largest ancient camp or earthwork in the district. Its shape is that of a parallelogram, and it measures from east to west 27 perches, and from north to south 24 perches.† The area within the vallum measures about 4 acres. At Swanacot Wood (in the same parish) is an oval intrenchment, in diameter 150 by 130 feet.”

Here again then we find the square and the round sufficiently near for one to be threatening the other.

The distances of the Roman camps from each other would of course be decided by many considerations depending on a variety of circumstances.

A solitary intrenchment might be constructed as a temporary fort to guard a fleet, keep open a road, or cover an advance; another might be established as a permanent post of observation; some might be for holding possession of a district and intimidating the people around; others, summer or winter quarters into which troops could be collected from outlying stations. Again, a line of earthworks at certain distances would mark the halting places of an army or of a detachment on the march. The Roman troops never passed a night, even on their longest marches, without pitching a camp, and fortifying it with mound and ditch if the ground would admit of its being done, and if not, they would enclose their prætorium with four living walls of men on the alert, defended by some kind of chevaux-de-frise;

* Hist. of Cornwall, published by Lake, Vol. 4, p. 308.

† 445 by 396 feet.

moreover, when preparing to storm the stronghold of an enemy, they first entrenched themselves on some convenient spot in its vicinity.

If it be urged that the Roman camps between Port Isaac and Bodmin are at less than the distance of a day's march apart, it may be replied that the troops, as we have surmised, may have been investing and attacking one British castle after another, and, if so, such fighting would cause the distance advanced each day to be very slight. The fortresses of Tregaer in St. Kew, Kelly Rounds, and Pencarrow, would all have to be dealt with, and silenced, before Boscarne Ford at Nanstallon could be reached,—to command which ford their own Tregaer had then to be constructed. Also it is just possible that the three Roman camps, Trevinick, Kelly, and Tregaer,—were garrisoned simultaneously; the cohorts occupying them being in support of each other.

But now, having noticed the Roman camps of north-east* Cornwall, and considered the probable objects for which they were formed, and having made some remarks on the military regulations which affected their occupants, and alluded to the different grades of Tribunes, Centurions, &c. in command, we must add a few words about their monumental memorials.

Scarcely any distinctively Roman interments can with certainty be pointed out in the neighbourhood, but the tumuli adjacent to the camp at Tregaer, overlooking Nanstallon, seem to be those of Roman soldiers, especially if some of the small plain urns in the Bodmin collection were found in them, as I have reason to believe they were, and if others contained ashes without urns. We have no such sepulchral inscriptions however,†

*In St. Neot's is a camp on Bury Down (described as "an oblong oval" and as being about the size of Tregaer) which may or may not be Roman.

The rectangular enclosures:—"Arthur's Hall," in St. Breward, and "the Crow Pound," in St. Neot, are much smaller. They are of unknown origin. Whether they were camps, places of assembly, or cattle-pens, has not yet been determined.

†Sir John Maclean recently sent me some to decipher, which I found to be "To the gods of the shades. Of Mettus, or Mettius, a Getan (i.e. Goth). He lived 35 years. His heir erected this."

intelligible to the civilized world, but names of Roman character had come into use among them. All this must have proceeded from subjection, fraternization, and the relationships which arose from close alliances, combined with education.

Lysons,* who states that he accidentally discovered this stone, when it was used as a prop at Rialton, has given its lettering incorrectly. The cutting is perfectly clear. Professor Rhys† agrees with my reading of it, published by the Society of Antiquaries,‡ as well as others who also have examined it of late years.

If Roman tribunes, &c., had been unknown to the Cornish, such a name as *Tribunus* would not have been conferred upon, or adopted by, the father of this deceased Briton, nor would the compound Latin name of the latter have been obtained.§

With regard to an investigation into the correct forms of these names, we must not omit to notice Professor Hübner's remark:—

“*Lysons tribunum aliquem agnoscit; crediderim subesse nomen Bonememorius barbare scriptum. Tribuni pro Trebonii fortasse positum esse Rhys observat.*”

* *Magna Brit.*, Vol. 3, Cornwall, p. ccxxiii, and fig. 2, in plate.

† Hübner's *Inscrip. Brit. Christianæ* (1876), p. 5, No. 13.

‡ *Proceedings*, 2nd Ser., Vol. 5, 1870-3, p. 485.

§ As names of persons and places in their original application were descriptive, those of the former were what we should now call nick-names. To some of these no objection was made by the persons to whom they were applied. There are instances of this even in later times. William the Norman was willing to be styled the Conqueror, and he used that descriptive title in some of his charters.

In the bestowal of the names *Tribunus* and *Bonemimorus* significance may have been intended.

The former of these terms did not simply and exclusively indicate a principal officer of the army. It originally meant head of a “Tribe” or clan; and in the Roman Constitution “*Tribunus plebis*” was a representative of popular rights. Thus in Romano-British times a Cornish Chieftain might properly have been styled *Tribunus*; and in these days a member of the Imperial or of the Local Parliament may be regarded as a Tribune of the people. One English representative statesman, recently deceased, was commonly known by that very title.

Bonemimorus or *Bonimemorius*, the man of good memory, the right-thoughtful, the nobly-mindful, recalls to us the fact that *Memor*, mindful, was in use as a Roman proper name. Its compound form resembles some others:—

No other inscribed stone in Cornwall besides this one has been regarded as a military tombstone. Latin names however occur not only on this one, but also on some of the other Romano-British stones, *e.g.* Latinus (at Slaughter Bridge, Worthy Vale, Camelford), Senilus (at St. Just, Penwith), Severus (at Pawton, St. Brooke), Vitalis (at St. Clement's).

But we must now describe the other camp in Cornwall which, like Tregaer, has been acknowledged to have yielded indisputable evidence of Roman origin and occupation.

BOSENS CAMP, St. EARTH.

This Roman intrenchment, 4 miles north-east of St. Michael's Mount, occupies in West Cornwall a position analagous to that of Tregaer by Nanstallon in East Cornwall.

It is about midway between the north and south coasts. It lies on the north side of the Marazion* and St. Hilary road leading to Redruth, and by straight-line measurement, is distant 3 or 4 miles from the first-named place, 2½ north of Pentreath, and 3 south of Hayle, which is on the St. Ives Bay estuary.

Bronze weapons have been found in the neighbourhood. Leland has recorded in his Itinerary:—"Markjue and the Mount be both in St. Hillaries parochie. There was found, of late yeres syns, spere heddes, axis for warre, and swerdes of coper, wrappid up in lynin, scant perishid, nere the Mount in St. Hilaries parochie, in tynne workes."

In the same parish (St. Earth) in which Bosens camp is situate, there is said to have been a second Roman† intrenchment at Carhangives, much less perfect, the remains of which exist on the summit of a hill, south of the road leading eastward, about

Bonifacies, handsome-face; Bonifatius, lucky, fortunate: Bonimoris, good-mannered; (glosses on the Greek Euprosopos, Eumoiros, and Kalotropos). In modern guise, derived in a similar way, we have Boniface, benefactor; Benedict, well-spoken of, praised; and this last brings to our minds the expression used in Divine Service, and found on many a bell in our church towers:—*Nomen Domini sit benedictum!*—The Lord's name be praised!—Blessed be the name of the Lord!

* For derivation of Marazion or Market-Jew, see Williams, &c., and an exhaustive dissertation in Bannister's paper on "Jews in Cornwall." The name seems to signify "The Markets," or trading Mart, or something allied to this.

† Hist. of Cornwall, Lake, Truro, Vol. 1, p. 384.

half a mile from St. Erth Bridge, and $1\frac{1}{2}$ miles from Bosens camp; but we cannot here enquire into its origin. Leland's account is,—“There was a castel caullid Carnhangives not far from the bridge. This bridge was made a 200 yeres syns, afore,—there was a fery. Ther cam to this place ons, the haven being onbarrid, and syns chokid with tynne workes, good talle shippes.”

But, with this brief note as to the neighbourhood, we must at once treat of the Bosens camp and its relics.

An interesting inscription, hitherto incorrectly read, and often so quoted, was discovered in it, the true lettering of which has now been ascertained and communicated to me by competent authorities. I am therefore able to make it known.

Before doing so, I will describe the camp itself. Like Tregaer and other such Roman works, it is oblong with the corners rounded, and is upon an elevation bounded by streams on three of its four sides.

From the ramparts there is a commanding view. One writer observes that Carn Brea and other important heights can thence be seen, and that the garrison could easily have maintained communications over land and sea by signal.

The enclosure is only half as long and wide as that of Tregaer by Nanstallon, consequently it was occupied probably by not more than a manipule of Roman troops, “a mere detachment” as Mac Lauchlan says. These may have been stationed in the camp to watch over the district.

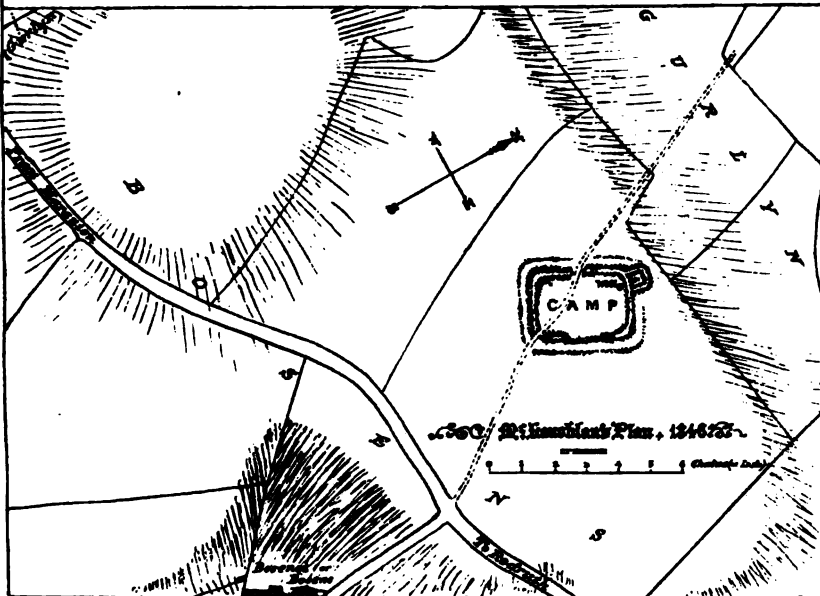
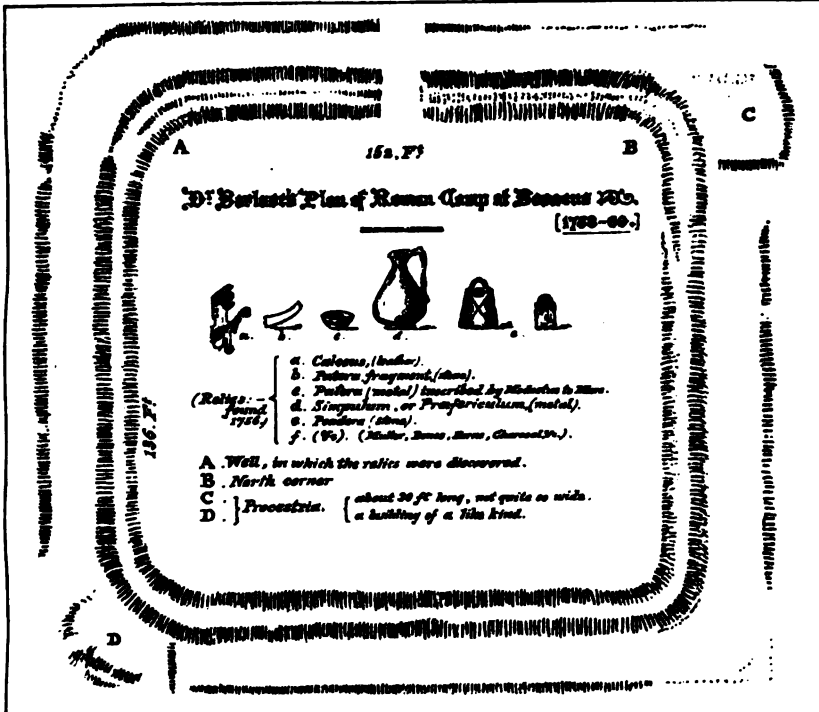
The estate called Bossens, Bosence, &c., on which it stands, is adjacent to Gurlyn, and close at hand are Bosworgy and Kirthen. Two, if not three of these places have derived their names* from the fort, for in Gur and Kir we yet again recognize the oft-occurring Gaer or Caer,—war place or camp.

*Gurlyn, River-fort or camp by the water ;—gaer or caer, camp ; lyn, water.

Kirthen or Kerton,—camp-lay ;—gaer or caer, camp ; ton, unbroken ground, fallow or pasture land.

Bosworgy,—Dwelling on the brook, Brook-house :—bos or bod, abode ; wor, upon ; gy, brook.

Bosense,—seized or captured dwelling ;—bos or bod, abode ; sengys or senges, taken or held ; but compare also (as an alternative) scians, knowledge ; Bos-sciens, house of intelligence or information, detective-station. We may reject, I think, the usually suggested interpretation,—Holy (sans), dwelling ; abode of saints.



Roman Camp, W. Cornwall, &c.

Plans of the camp have been published by both Dr. Borlase and Mac Lauchlan; the former went to view the place on 22nd May, 1758, and perceived the remains of the fort covered with bushes and briars on the higher part of the tenement in a field called the Rounds.

Each of these observers has assigned to it the same general form. Borlase remarked that it was dismantled in such a manner as at first sight to appear to be oval, but on further inspection it proved to be rectilinear with the angles rounded off.

He has marked the place of the well in the west corner, but Mac Lauchlan (in 1846) indicated it in the north. Perhaps there were wells in both places.

An entrance to the camp, in the middle of the north-west vallum appears in each plan. Mac Lauchlan has traced a path from this to the south-west corner, in which he has drawn another opening leading to Bosens farm house. Outside this corner, and outside that in the north, Borlase noticed rectangular projecting works,—“procestria.”

Only the northern annexe appears in Mac Lauchlan's map. Dr. Borlase gave the size of the northern square projection as 30 feet in length by somewhat less in breadth, and has stated that the camp itself measures nearly 152 feet from north to south by 136 from east to west.

The well is of special interest. Borlase has described its being found, in 1756, by the Bossens farmer, who, on driving oxen from the field, perceived that the foot of one sank deeper than ordinary, at this spot. On searching, a perpendicular pit was revealed,—a circular shaft $2\frac{1}{2}$ feet in diameter, 36 feet deep, the bottom concave like a dish or bowl. In its sides, holes were observed, at due distance; capable of admitting a human foot. This arrangement, affording a series of steps, served as a ladder for the ascent and descent of the well.

Rubbish, containing several objects of archæological value, filled the well.

The following (one being inscribed) were found:—

- (A). Jug; tapering to small mouth, handle extending from brim to bulge; height 11-inches, diameter at bulge $8\frac{1}{4}$, according to Mr. Haverfield who has lately seen it, and who

has kindly given me information concerning this collection. He writes that it is of lead. Dr. Borlase called it tin, and has stated that it contains rather more than a gallon and weighs over 7½-lbs.

- (B). Bowl, or Cup; circular, without handles; height 2-ins., thickness $\frac{1}{10}$ -in., diameter at mouth 4½-ins., at flat base 2½-in. Scratched on the bottom, within, is an inscription surrounding a central letter. Dr. Borlase suggested a reading of the legend "till better informed;" his reading unfortunately was incorrect, and has misled many by whom it has been quoted. The true reading will presently be shewn. Material of bowl, pewter (a mixture of tin and lead); Borlase called it tin, which Hübner renders "plumbum album."
- (C). Another Bowl; with 2 handles; described by Dr. Borlase as being in other particulars much of the shape and size of the former one. Mr. Haverfield gives diameter 5-ins.; material, lead or perhaps same as foregoing.
- (D). Fragment of large Vase; described by Borlase as having been formed by turning, and well polished; material a curious sort of grey granite.
- (E). 2 weights of stone; tapering; top part rounded, with hole, to serve as handle. According to Mr. Haverfield, there are two cross lines for rough ornament somewhat resembling the letter or numeral X.*

		lbs.	oz.	dwt.	
One weighs	..	14	10	11	and is 8-ins. high.
The other weighs	4	1	7	„	5½. „

*From Borlase's illustration (Antiq. 2nd edition, p. 316, &c., pl. 28), Professor Hübner was led to suppose that one weight was marked with this letter or numeral (Corpus Insc. Lat., Vol. 7, p. 232).

These two weights, in Roman pounds, would represent rather over 20 and 5½ respectively, the Roman pound being usually reckoned at from 5040 to 5053 grains, and even (by a computation derived from the corroded congius of Vespasian) at over 5203 grains; this last being probably too much. The Roman pound seems to have been a little less than ½-lb. Avoirdupois. There are many Roman weights existing, but they differ greatly amongst themselves, being carelessly made, especially in the provinces. They are so unreliable as to give no certain results by comparison. A full account of them will be found in Böckh, pp. 168-196. Borlase's lbs. and ozs. are avoirdupois.

- (F). Mill-stone; small; diam. about 18-ins.; displays marks of use.
- (G). Fragments of horns, bones of various sizes, half-burnt sticks, many pieces of leather (some pierced with holes) shreds of worn-out shoes (the calceus) &c.

The metal and stone articles mentioned above are deposited in the Ashmolean Museum, Oxford, all having been presented by the Rev. Dr. Borlase except one of the weights, which Davies Gilbert added. There are with them two pieces of red pottery which Mr. Haverfield considers also formed part of this collection of relics found at Bossens.†

From an examination of these remains,—the well in which they were found, and the Camp itself, Borlase came to the conclusion that they indicated something more than the mere halting place of a column on the march. The fort, although small, was of such a character, with towers projecting beyond its simple vallum, and with a deep well so carefully formed within it, that it must have been (he considered) one of those fortified posts called *Castra Æstiva*.

The summer season, or earlier, and down to December, in a moderate climate, being the appropriate time for campaigning, called into requisition such camps as would serve as strongholds without assuming the formidable dimensions of the winter

† 2 other stone Pateræ or bowls, found in St. Just, Cornwall, and presented by Borlase, are in the same Museum, Mr. Haverfield informs me. Measuring 4½ and 5½-inches in diameter, they are doubtless those figured and described in the *Antiquities* (pp 288-9, pl. 21, 1st edition), see Lysons, cccxiii, Note n.

Another stone Patera, 10-ins. in diam. and 3-ins. high, found at Ludgvan, was included in the same plate and description, and Borlase has further shewn some bronze articles:—an animal's head, a hinge, and a strainer, which were discovered at the foot of Carn Brea hill, 3-feet underground, together with a pint of Roman coins of 4th century (pp. 287-8, and 279, pl. 5). Other finds of British and Roman coins mentioned by him, are also of special interest, as bearing on this part of our subject, but to them we cannot now allude further than to observe that Cornwall is said to have yielded money made of leather, lead, iron, bronze, silver and gold. The bronze dagger-blade found in St. Ewe and figured by Borlase (Pl. xxv, and p. 311, 2nd Ed.) and some celts from Cornwall are also in the Ashmolean museum. The bronze bull, marked on the side with a crescent, and supposed to be either Phœnician or Roman, is in the Truro Museum. It was found at St. Just-in-Penwith, and has been often figured and described. Roman bronze mirrors &c., &c., have also been discovered in Cornwall.

quarters of an army. "*Dimittere cohortes in æstiva*," "*Perducere æstiva in mensem Decembrem*," are phrases met with in writings of the 1st and 2nd centuries A.D.; and such *castra æstiva* in mild West Britain would probably suffice for the control of a district all the year round.

Borlase, judging by the remains, inferred that this camp, of Gurlyn-Bossens, was occupied by a fixed garrison,* and he found his view strengthened by observing not only its central position between Marazion and Hayle, to which we have already alluded, but its being situate on a line leading directly from Truro to Mount's Bay and the Land's End, and at a spot well calculated to influence all the region west of Falmouth Harbour.

Indications of Roman occupation or traffic in the neighbourhood are not confined, however, to the existence of this camp and its contents.

Roman coins have been discovered close at hand:—"In 1779 an urn filled with Roman copper coins was found on the barton of Godolphin, about half-a-mile from the Roman fort at Bossens, and the farmer who found them, sold 8-lbs. weight to a Jew†"—(about 1200 small brass probably).

Samian ware and many Roman coins have also been found in various parts of West Cornwall. The coins have been dug up in almost every parish, as may be seen by reference to Leland, Borlase, Tonkin, Lysons, and other writers. We have records of finds in St. Levan, Buryan, Paul, Sancreed, St. Just, Morvah, Ludgvan, St. Hilary, Breage, Sithney, Wendron, Constantine, St. Anthony-in-Meneage, Budock, Feock (and other parishes about Truro), St. Agnes, Illogan, Camborne, Phillack, &c., and perhaps there is not a western parish that has not disclosed some. Roman coins have also been found in the Scilly Isles‡, and Mr. Tregellas, through Mr. H. Michell Whitley, has just called attention to the curious fact that in the new Ordnance Map a "supposed Roman road" is marked, on what authority I know

* If this word were not supposed to be derived from *garnir* (Fr.) to furnish, whence *garrison* or *garrison*, we should once more be tempted to connect it with *gaer*, *caer*, *castra*, *guerre*, &c. On the use of *Caer* as a derivation, see "*Borlase's Antiquities*," 2nd Ed., p. 326 and note.

† Lysons, *Cornwall*, ccxxv, who quotes Borlase.

‡ B.I.C. Journal, Vol. 4, No. 15, p. xxvii.

not, near Rocky Hill Lane, in the Island of St. Mary's. But to revert to the Bossens camp (perhaps more appropriately called Gurlyn), and its surrounding associations:—

We have already noted that at Carnhangives or Caerhangives, was another fort, supposed to have been Roman, only $1\frac{1}{2}$ miles to the north-west, near St. Erth Bridge, "where once was a ferry;" and we must now observe that in a perfectly straight line with these two camps was a third,—a much larger one,—named* Pencair or Pencairn. It is on the north-western summit of Tregonning Hill (another point of which eminence has been used as a signalling station down to modern times), exactly 2 miles south-east of Bossens.

The intrenchment has been described† as "neither circular nor rectangular," but irregular with double vallum, &c., the inner space measuring 106 by 92 yards (*i.e.* about 320 by 280 feet), about the size of Tregaer, Nanstallon. In the inch-mile Ordnance Map I see it shewn quadrate with rounded corners.

The Rev. S. Rundle has written§ some important particulars about this castle or great camp, with its gal-gal (called the giant's lapstone), its ruins of masonry and little stone casting-mould or covered trough, now in the Museum, at Truro. With reference to this spot, its reduced "lapstone" and pile of fragments, he observes:—"coins were found in it, or by it, about 60 years ago."

Unfortunately here the record ends, and circumstances have hitherto hindered me from visiting the spot. Some portions of its description would lead us to suppose that it was British, but, if it be of the form shewn in the map, and if coins were found (as stated) in its glacis, it was probably a Roman work.

* Pencaer (singular), Head Camp or Castle; Pencarrow would be its plural. Cairn,—pile of rocks or stones.

† Tre,—dwelling; gon, goon,—down or common; an,—the; (? The dwelling on the down). This name is applied to a farm just below, which perhaps gave title to the till; but Leland calls the castle Caer Cenin, therefore, vice versâ, it may have given name Tre-cenin, Trekenning, or Tregonning, to the farm. The word is variously written Cenin, Conin, Gonyñ; and Tregonning is pronounced Tre-gonan in the locality. Cynin, kyningen, coning, signifies rabbit or coney.

‡ Hist. of Cornwall, Lake, Truro, Vol. 1, p. 136.

§ Royal Inst. Cor. Journal, Vol. 9, p. 360.

Mr. Rundle adds, that around the hill or on it, within $\frac{1}{2}$ of a mile, are the traces of "7 camps," and at the same distance the "Giant's Holt or Hold,"—a fogou, probably British. On the slope of the hill is a shallow well enclosed with masonry and approached by steps. From his account it seems that the neighbouring camps were circular British strongholds.

Here then we have again, perhaps, a Roman fort in the midst of British castles,—intruded amongst them with hostile or coercive intent. In that case Pencair formed one link of a Roman chain, Bossens and Carhangives being the others.

"The vast circumvallation" of Pencair is but $1\frac{1}{2}$ miles from the south-coast at Pentreath* (Sydney Cove, Pra Sands), and like camps of Roman style, has confluent streams on two of its sides. This Camp, if not Roman and connected with that of Bossens, was a great British stronghold threatened by it. Within and without Pencair are the remains of apparently British huts.

The river which rises near the foot of the hill on which it stands flows north-westward to Hayle, cutting off all the country about Mount's Bay and St. Ives Bay down to the Land's End.

The 3 forts, Pencair, Gurlyn-Bossens, and Carhangives, follow exactly the direction of the Hayle river, and, on its eastern side, are dotted across the country at equal distances apart, in a straight line extending from south-east to north-west; the two end camps are at similar intervals from the two coasts, Bossens being in the centre.

The distances (by straight-line measurement) are the following:—

Northern sea at Hayle,	..	..	..	}	$1\frac{1}{2}$ miles
to					
Camp at Carhangives, St. Erth,	..	..	..	}	$1\frac{1}{2}$ "
to					
Roman Camp at Bossens, by Gurlyn, ..	..	..	..	}	2 "
to					
Camp at Pencair, on Tregonning Hill,	..	..	..	}	$1\frac{1}{2}$ "
to					
Southern Sea, at Pentreath,	..	..	..	}	3 "
or at Porthleven	..	..	..

* Head of the sands ; treath, traith, harena,—sandy-beach.

Hayle to Pentreath, 6 miles	}	Bossens Roman Camp
„ Porthleven 8 „		is about midway on
„ Marazion 4½ „		each track.

Other lines, combinations and complications of forts, British, and apparently Roman, form an interesting study on the map.

Castle-an-Dinas, on the midland north of Penzance, was doubtless in alliance with other round Castles nearer Penzance, and some towards the other coast—and not far off we find more than one Kerrow.*

On the south of the Helford river, Gaer, Garras, and Tre-gear occur.

There are other quadrate and round castles almost jostling each other in various localities, and the greatest of all the camp systems of Cornwall is on the Fal in the Grampound† district, where some of the earthworks have strong indications of Roman form.

The situation and shape of Burgh-gear (near Gaer-, or Garlinnick) should be noted, also the mounds of Caerfossa or Carvoza, and Golden or Wolverdon, which are deserving of special attention. In all or most of the following also, situate in various localities, straight sides and rounded angles unmistakeably appear :—Pencoyse (in Creed), Kaer-an-Kledh (by Lambron), Goodern, Gwarnick, Trelower, Golowras (in Gorran), Higher Tregurrow, Benallick-Dinas (by Cregou), Quarry Gerras, Cargol, Gillies Castle or Engelly, Hammet, &c.

But we must not be tempted to describe these. All the Cornish camps should be tabulated as to form, size, contents, name, and position. We must return from this digression to the Gurlyn-Bossens Camp Well, and to the relics found therein, so that we may complete our description of them.

As to the well, Dr. Borlase was struck with its depth, excavated with such narrowness,—through stony ground. He considered that the work must have been performed with great

* Carrow (plural of Caer or Gaer),—intrenchments.

† Grandis-pons, (Lat.) whence pont,—Grand, massive, enlarged or great bridge. Perhaps this abundance of camps may favor the theory (supported and disputed) that Cenia was at or near Tre-gony, or on the Kenwyn River. Caer-cenin (Tregonan or Tregonning Hill Castle), has not been suggested as offering any clue to the site of Cenia.

difficulty, only small tools being then in use. Bronze celts and wooden spades (some of them perhaps edged with iron), were probably the chief digging implements employed by the Romans at Bossens. In these days, of course, with modern tools the sinking of such a pit or shaft would be less tedious. Iron pick and gad have taken the place of the bronze celt, so have the iron bar, the handy beat-axe or biddix, and the heavy visgey. The wooden spade, too, has been superseded by the iron shovel or showl (with long handle and no cross-piece), so dexterously wielded by Cornishmen, in so different a style from all "up-country" modes of spading. The Roman spade (pala) had a cross-bar for handle, and another above the blade enabling it to be driven to extra depth.

But now to conclude our remarks on the objects dug out of the Well.

They resemble in some respects Roman remains found elsewhere.

The leaden jug (A) bears a striking resemblance (Mr. Haverfield informs me) to one of tin which was dug up at Caerhays,* in 1869, containing (as I have ascertained from various sources) more than 2000 3rd century Roman bronze coins (small brass). I observe also that it resembles another jug or pitcher which was discovered in Somersetshire a few years ago, which has been figured and thus described:—"A pewter vessel found at East Harptree † containing nearly 1500 4th century Roman

* Perhaps from Caer or Gaer and hays,—camp enclosures, castle closes; but hâz or heys also signifies length. Caer-heys might therefore be castle of length, i.e. long or oblong camp, and is suggestive of a Roman fort. As to the find, see Roy. Inst. of Corn. Journal, Vol. 3, No. 12, p. xxi, and p. xxix. The leaden jug is at Carhayes. Of the coins found, about 1600 passed into the hands of Mr. Williams, but one of the finders now dead, retained about 1000. Some of both portions have since been given away, 30 to the Museum at Truro, 28 to Mr. W. C. Borlase, about 100 to Wisbeach Museum, &c. Over 1300 remain at Carhayes, and have been sorted by Mr. Haverfield. About 800 have been lent to me by the kindness of Mr. Dunn who had acquired them, and these I have examined and have since forwarded to Mr. Haverfield, who has obligingly promised to make a list of all that can be traced, for insertion in this Journal. Mr. Dunn understands that the jug containing them was enclosed by three stones within a mound of earth.

† Numismatic Chron., 1888, p. 23. Soc. Antiq. Proc., Vol. 12, p. 56, Second Series. This hoard was deposited circa, A.D. 375.

coins, and a Roman silver ring." Again, I find mentioned "A Roman vessel of copper in which a number of copper coins were found." This last was exhibited at Penzance,* by the Antiquarian Society of that town, on the occasion of the visit of the British Archæological Association. "Brass pots" full of coins, —(by which perhaps copper vessels are meant), are stated to have been found also in other localities.†

The pewter bowl or cup (B) is the most interesting of the Bossens relics. The inscription is on the flat interior of the base, and has hitherto been wrongly given by those writers who have published it.‡

In my address, at the Spring Meeting, 1887, I remarked that it would be very desirable to obtain, if possible, the loan of this cup,|| in order that we might inspect it, and exhibit it at one of our ensuing Royal Institution Meetings. Hoping to effect such an arrangement, I wrote to Mr. Arthur J. Evans, M.A., F.S.A., the keeper of the Ashmolean Museum. He replied that he regretted not being able to lend the cup, —the laws being absolute, which prevent objects from being sent out of the Museum, —but he offered me every facility if I would come to examine it, and further, very kindly forwarded to me a copy of the legend which corrects the reading hitherto received.

Dr. Borlase was the first to publish a version of the lettering, his words being:—"The inscription, till better information, I read thus,

LIVIVS MODESTVS DRIVLI (or D^UIVLI) FILIVS DEO MARTI.

He explained that there was the letter F for filius, and that the third word might be DOUVILI or DUVILI, its second letter being either a Greek Rho or perhaps the Greek diphthong for ou, and he considered that many of the characters in this Latin legend were of Greek form.

* Journal of the Brit. Archæological Assoc., Vol. 33, p. 203.

† By the river Camel (Harrison). At Treryn (Leland). Borlase's Antiq., 2nd Ed., p. 300.

‡ Borlase's Antiq., 2nd edition, p. 316, pl. 28. Philos. Transac., 51, p. 1, 1759, p. 13, &c. (and see other references in Hübner, p. 13), Polwhele, Lysons, &c. History of Cornwall (Lake). Vol. 1, p. 364, &c.

|| Royal Institution of Cornwall Journal, Vol. 9, p. 130.

Other Cornish historians have quoted him.

Dr. Hübner was wisely cautious. Being much interested in the matter, he published an account of Borlase's reading as Inscription No. 1 in his great collection* entitled "*Inscriptiones Britannicæ Latinæ*."

He wrote (we abridge his text):—"Patella...reperta in Campo Romano (ut creditur)...apud Bossens; in cuius fundo in circulum punctis scriptæ sunt literæ. Literæ sunt cursivis simillimæ (non ex græcis et Latinis mixtæ ut Borlasius voluit)."....&c.

And added†:—"Patellam illam servari Oxonii testis mihi est A. W. Franks; sed peritam ejus lectionem nondum nactus sum."

The "perita lectio," here longed for, has now been obtained; notwithstanding that Lysons stated,‡ in 1814,—"no part of this inscription is now legible" (!).

Mr. Evans has thus communicated it to me:—

"Ashmolean Museum, July 9th, 1889.

* * *

...I have at different times very carefully studied the graffito inscription in the cup, and I have no doubt whatever as to the right reading:—

{ AELIUS MODESTUS DEO MARTI
E

There is space for two letters between Aelius Modestus,—(not Julius or Livius Modestus, as erroneously read before), and Deo Marti; but there is no trace of letters. Where Borlase got Driuli filius, it is not possible to conceive."

* * *

Mr. Haverfield, a well-known writer on Roman Inscriptions, gave me a confirmation of this, in these words:—

"Lancing College, July 13th, 1889.

* * *

...About the Bossens cup,.....I copied it with Mr. Arthur Evans,..... The emended text is clear enough."

* * *

* Corpus. Inscr. Lat., Vol. 7, Berlin, 1873, p. 13.

† Idem, p. 305.

‡ Lysons, p. CCXXIV, note.

DRAW**SIZE OF ORIGINAL**

— **Assimiles** —

**ROMAN PATERA DEDICATED TO MARS.R.
(NOW IN ASHMOLEAN MUSEUM).**

Not "Iunius Modestus Iunij deo Marci"; but "Sedius Modestus deo Marti [.....]"

He subsequently wrote:—

"The true reading is, *ÆLIUS MODESTUS DEO MARTI*, round the bottom of the inside, and, in the centre of the circle, the letter R. This was made out by the Curator of the Museum, Mr. A. J. Evans, and after carefully looking at the object myself, I am sure he is right.

It is simply, *ÆLIUS MODESTUS TO THE GOD MARS*. What the central R means, I do not know.

Borlase read '*Livius Modestus Driuli f[ilius] Deo Marti*,' but there are neither letters nor space for letters between Modestus and Deo."

Mr. Evans enclosed a facsimile of the lettering, which I copy to illustrate this paper; and Mr. Haverfield, a photograph of the cup.*

With regard to the supposed names, Dr. Borlase shewed that they were in common use. We can do the same with respect to those really found. *Ælius* and *Modestus* both occur very frequently in Roman inscriptions, the former as a "nomen," the latter as a "cognomen." No "prænomen" appears in this legend.

By a curious coincidence we observe that just as this patera, libation-bowl, bason, or cup, in Cornwall was dedicated by some warrior to Mars, so was an altar to Hercules in Northumberland by a cohort of Roman soldiers under the command of an officer, whose name was very similar, if not identical. In the Newcastle Museum is an "ara"† 3-ft. 7-in. high, 1-ft. 9-in. broad, thus inscribed‡:—

HEROVLI	}	[The soldiers of the 1st cohort of the Tungri, (over which Publius <i>Ælius</i> Modestus is Prefect), to Hercules].
COH. I. TVNGROR.		
MIL.		
OVI PRÆEST P. AEL MODESTVS PRÆF.		

This Publius *Ælius* Modestus, then, was Prefect§ of the 1st Tungrian|| Cohort. Moreover Newcastle itself, at or near the

* The leaden jug (A) found with it, and the very similar tin jug discovered full of coins at Caerhayes, being also shewn in the same view. The former, with its handle, is complete; the latter is deprived of mouth and handle,—its discoverers having mutilated it, to get at its contents.

† From Housesteads situate near the middle of Hadrian's wall.

‡ Hübner, No. 635.

§ A *Præfectus Sociorum* corresponded to a Legionary Tribune.

|| Tungri, a German people who settled in Gaul, where are now the Netherlands. Their chief town was Tongern or Tongres (on the Jaar, 9 miles from Liege).

eastern end of Hadrian's Wall, was called Pons Ælius or Ælii, just as Jerusalem was named Ælia after its restoration by the same Emperor, Ælius Hadrianus.

But the name Ælius is so well known, in a variety of connections, that we need not dwell further upon it.

We are unaware whether any Tungrian cohort was ever stationed in Cornwall, and therefore we cannot assert that Ælius Modestus, once at Bossens camp, was the same as Publius Ælius Modestus the Roman officer who held a command in the north at some other time. Modestus (the Modest), as Borlase has shewn, is a surname often met with, and I have observed it in many inscriptions; for instance on a copper tablet,* discovered at Malpas in Cheshire, and now in the British Museum, inscribed with Trajan's declaration of privileges to certain members of the army;—one of the officers mentioned being Modestus, another Vitalis, &c.

We must now add a few words about the dedication of the bowl. Of course no deities were more likely than Mars and Hercules to be found mentioned with honor in the Roman military stations.

Mars was especially the Roman warrior's patron; not only was he regarded as the ruling spirit of sanguinary encounter, but next to Jove, the king of heaven, he enjoyed the highest honors at Rome. He was designated Father† Mars because the Romans considered him the progenitor of their nation. They believed that Romulus, the reputed founder of their city, was his son. As Gradivus, Quirinus, and Silvanus, he was worshipped as patron of military prowess, of citizenship, and of the honorable pursuit of agriculture. He was guardian of men and of cattle. The priests of this valiant deity danced in full armour, in the place called after him Campus Martius. He had various titles besides Pater, Genitor, &c., such as Bellicus, Cruentus, Durus, Ferus, Ferox, Pacifer, Torvus, Ultor, Victor. "Per Martem" was a soldier's oath, and Rome itself was "Urbs Mavortis."

* Hübner, No. 1193.

† Jove's name compounded with Pater became Jupiter, similarly that of Mavors, Mavers, or Mars, compounded with Pater became Maspiter.

On a coin of the elder Tetricus, found at Caerhays, Mars is represented marching boldly, without any other covering than a helmet, wielding his spear and bearing off a trophy on his shoulder, whilst around him is the legend "Mars Victor." On a coin of Gallienus, found in the same collection, is a figure of Mars standing fully equipped in armour, with weapons at rest, and holding out an olive-branch, the legend being "Marti Pacifero." War we may suppose had secured peace with honor.

The rites of lustration in the Bossens camp would doubtless be performed by means of the little bowl. In the neighbourhood of the commanding officer's tent, towards the Prætorian gate, the altars stood ready for public devotion and sacrifice. Cato has preserved to us a formula in which the blessing of Mars was invoked by his worshippers on themselves and on all belonging to them, commencing:—"Mars, Pater, te precor quæsoque uti sis volens propitius mihi, domo, &c., &c." Lustrations were originally purifications by ablution in water, but were connected with sacrifices and fumes. The water was sprinkled either with a branch or by means of an asperge, and was carried round the person or object to be purified, generally three times. Roman armies were lustrated, before they took the field; so was a fleet, about to sail. The Romans also performed lustration on many other occasions. The priests officiating were accompanied by the principal persons able to be present.

It is not easy to conjecture the meaning of the letter R which is inscribed in the centre of the Bossens bowl, and around which the other words run, but perhaps some light can be thrown on the matter if attention be directed to it. If it should stand for the concluding word of the inscription the legend must be read thus:—

ÆLIUS MODESTUS DEO MARTI R.

With any part of the verb *rogo*, or case of the substantive *rogatio*, something more than now appears would perhaps have to be expressed. The R may stand for some title or description applied to Mars. We might make many guesses without arriving at a solution. R naturally suggests something Romulian, something connected with Rome or its people or armies. The legend might simply be "Ælius Modestus Deo Marti Romanorum."

Again, one or other of the gods is styled Restitutor. Mars might be called Repressor, Raptor, &c. Fortuna is named Redux, and Juno is described as Regina. But, to try back again, R may refer to the donor and dedicator of the patera. He may have desired to express his citizenship, or his being a victorious Roman soldier, and then perhaps we may read "Ælius Modestus, Romanus,* Deo Marti." Most likely however a comparison of this inscription with others will give a better clue to the meaning intended, and amongst many dedications to Mars, I observe this one in particular (described as being on a thin plate of bronze†), at Chessels, West Coker, Somersetshire,

DEO MARTI
RIGISAMO
IVENTIVS
SABINVS
V. S. L. L. M.

probably for:—"Deo Marti Rigisamo Inventius Sabinus votum solvit lætus libens merito." Moreover I find that the term Rigidus is applied to Mars by Ovid; (Metamorph, 8, 20.)

We will close these remarks about the libation-bowl inscribed to Mars by mentioning that at Lincoln‡ a curious vase, of white ware, was found, 10-ins. high, on the front of which was a human face, and around the base, outside the jug, a dedication to Mercury, in painted letters:—DO MITHRIBIO. The letter x being formed of two perpendicular strokes, resembles very nearly the corresponding letters on the Bossens cup.

A beautiful bronze dish or bowl, with long handle, designed to be used in the worship of Mars,§ was found at Pompeii, and a shallow white marble bowl of great delicacy appropriated to the worship of Bacchus|| in Hadrian's Villa. Numerous dedicated pateræ, &c., besides, are also well-known to archæologists.

Sufficient description, perhaps, has already been given of the other objects (C), (D), (E), (F), (G), by Borlase and in this paper. We will therefore pass on from them with a very few remarks.

* In Lancashire is this legend, viz:—Deo Marti et Victoriæ P. R.no..... CO. NN." which is supposed to stand for:—Deo Marti et Victoriæ Populi Romani in honorem Cæsarum Nostrorum. (Hübner, No. 220).

† Lamina ænea tenuis (Hübner, No. 61).

‡ Soc. of Antiq., Proc., Vol. 3, 2nd series, p. 440, with illustration.

§ Donaldson's Pompeii, Vol. 2, p. 78.

|| Smith's Dict. Greek and Roman Antiq., p. 872.



AS SHOWN BY REY D^R BORLASE

(DEDICATION.)

AELIUS MODESTUS DEO MARTI
R



FORM OF
LETTERS

AELIUS MODESTUS
DEO MARTI R

PEWTER BOWL & LEAD JUG FROM BOSSENS ROMAN CAMP

THRO' THE CAERHAYES COINS, THE COLLECTION RANGING FROM VALERIUS TO PROBUS. (A.D. - 260)



GALLIENUS AUG.



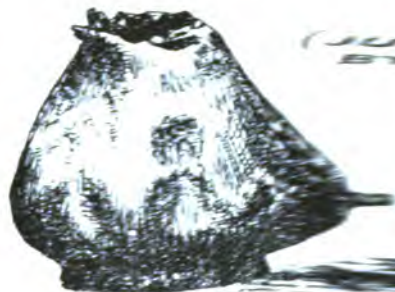
MARTI PACIFERO. A.



IMP. C. TETRICUS P.F. AUG. MARS VICTOR



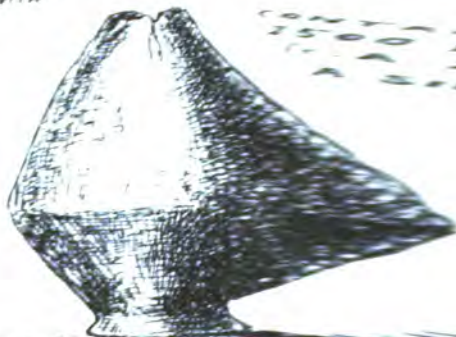
2600 SMALL BRONZE ROMAN COINS (3rd & 4th BRASS) IN TIN JUG, FOUND AT CAERHAYES



(JUG BY REY D^R BORLASE)



FOR COMPARISON WITH
THE ABOVE



CONTRAST
WITH
THE ABOVE

(WHITE WARE)
JUG DEDICATED. - DO MERCURIO; FROM LINCOLN.

PEWTER VESSEL FROM SOMERSET

Roman relics.

We observe that hand-mills and weights have been found in earthworks in different parts of the country, and with regard to some which have come to light in Cornwall, no evidence of their being Roman has been offered. A stone once used for weighing, and inscribed with its weight in Roman numerals, &c., was found in the stream at Stairfoot, in St. Erme, and is now in the Museum at Truro. Some time ago I described and figured it in this Journal,* shewing by certain tests that it was not Roman but of rather late character.

The remains of shoes found in Bossens Camp Well, and those from the neighbourhood of Tregaer might have afforded, had they been preserved, some curious examples of Roman make. Dr. Borlase has figured part of one of them as shewing the construction of the calceus. Great varieties of form prevailed amongst the Roman people, from sandals to full coverings, and their different fashions obtained fancy names as in our own day. A marble foot in the British Museum shews the form of a man's tied shoe,—the sole and upper leather being thick and strong, the toes uncovered, and a thong passing between the great and second toes as in a sandal. This specimen and others, somewhat different, when compared† with Dr. Borlase's engraving of the pierced leather found at Bossens, give a good idea of the various kinds of calcei, &c., worn by the Romans.

Having now discussed the forms, positions, relics, and other characteristics of the two oblong camps in Cornwall (one in the north-east and one in the south-west) which, true to their shape, have yielded inscriptions and other unmistakeable evidences of being Roman, we have to point out that in their neighbouring districts are Stones inscribed with the names and titles of Roman Emperors.

At St. Hilary (near Bossens), is one, well-known, in honor of Constantine.‡ At Tintagel (north of Tregaer), I have lately found another, which is in honor of Licinius.

* Vol. 8, p. 285.

† Borlase's *Antiq.*, 2nd Ed., p. 320, pl. 28. Smith's *Antiq.*, p. 221.

‡ Probably Constantine the Great, as shewn by the late Dr. Barham.

Measuring by straight lines—

Constantine's stone is $1\frac{1}{2}$ miles S.W. from Gurlyn-Bossens camp.

Licinius's stone is $13\frac{1}{2}$ miles due N. of Tregaer, Nanstallon camp.

These two Emperors reigned together over different parts of the Roman Empire in the 4th century, and, being brothers-in-law, they seem to have complimented each other by having had titled stones erected each in his territory to the other's honor, till final contests, &c., led Constantine to order that Licinius should be put to death. It is noteworthy that in West Cornwall where the Imperial memorial of the Christian ruler Constantine occurs, the Christian symbol is met with, which was emblazoned on his labarum or military standard, his coins, &c.; and that there is also a dedication to St. Helena, the name of his mother.*

The "X (chi) P (Rho) monogram," (the Greek χ and ρ , for *Christos*, *Christ*), occurs on one stone at Phillack and on two in St. Just. A block of tin, found at Treveife, is said to be similarly marked,† also some Roman pottery found at Padstow, in East Cornwall, stamped with cross and sacred monogram.‡

That at Phillack is built into the church wall.

The next is on the broad face of a slab, in St. Just Church, on the front side of the stone the name *Senilus*§ being inscribed. It is usually referred to erroneously as *Selus* or *Silus* with incised pastoral or episcopal crook. The truth is, the letters *nr* were omitted in cutting the name and were added above the line, —thus escaping the notice of many, whilst the supposed "crook combined with cross" is really the sacred monogram mentioned above. The third instance is in the same parish, at Cape Cornwall:—"On the isthmus," writes Blight,|| "the remains of

* Concerning her alleged finding of the true cross, the form of it, and the tombs of the Magi, see *Chamb. Book of Days* (St. Helena, Empress), Vol. I, 586, Vol. II, 233, 751, and *Blight's Crosses of West Cornwall*, p. v.

† *Hübner's Inscr. Brit. Christ.*, p. 85, appendix. Object in *Penzance Museum*,

‡ *Archæological Journal*, Vol. 4. 1847, p. 307, Haslam; and *R.I.C.J.*, Vol. 6. p. 32, W. C. Borlase.

§ *Blight's Churches of West Cornwall*, p. 28, fig. (orig. edn).

|| *Blight's Week at Land's End*, p. 155, fig., and *Crosses of West Cornwall*, p. 61.

an ancient chapel, within its original enclosure, may still be seen; it is called *Parc-an-Chapel*, the Chapel field; it was known as *St. Helen's Oratory*. In a water course, near the ruins, a small stone cross was found; supposed to have been the gable cross attached to this structure; it bears the monogram of Christ frequently used by early Christians as well as in Mediæval times."—This last stone, after being removed to the chancel* of *St. Just Church*, was, we are told, thrown down a well, where it now is.

Yet, notwithstanding the memorial of the reign of a Christian Emperor, and many evidences of early Christianity having made its way in West Cornwall, remains of heathen rites still exist.

Besides the libation-bowl dedicated to *Mars*, ceremonies survive which have probably been practised ever since their introduction by heathen Romans. The Solstices are still celebrated (nearly enough as to date) by the kindling of midsummer bonfires, &c., at *Penzance*, and by the revels of winter mummers. Also we find, not far off, at *Helston*, the *Floralia* still observed with considerable assiduity.

Christianity having been unable at once to break down existing popular customs, diverted many of them to a new purpose, perhaps slightly changing the day. Thus we find now the festival of the Summer Solstice at *Penzance* changed, from June 21st, to June 23rd, the eve of *St. John the Baptist*. That of the Winter Solstice, from December 21st, to December 25th, for Christmas, and the *Floralia* at *Helston* from a few preceeding days,† to May 8th, the apparition of *St. Michael the Archangel*. By what is called canting or punning Heraldry the head of *St. John the Baptist* in the charger, was granted as an official badge to *Pen-Sans* (Saint's head) or *Penzance* (which is capable of a very different derivation); and *St. Michael* appears in the official cognizance of *Helston*. Thus then with fires, flowers, dances, &c., are the heathen festivals still maintained, in slightly altered form and with a changed purpose. "The Winter

* Buller's *St. Just*, p. 45.

† *Floralia*, in honor of *Flora* or *Chloris*, celebrated April 28th to May 2nd, with much merriment.

Solstice" we read* "has been celebrated in Newlyn by children dancing round candles stuck in a basket of sand;" and it was the custom on Christmas Eve, when the weather allowed, to light 50 or 60 candles on the summit of Paul Tower. Other parishes also kept up customs of apparently heathen origin.†

Before describing my examination of the two Imperial stones of Constantine and Licinius, I will refer to the Roman Station which existed on the north coast of Cornwall, at Padstow.

ROMAN STATION BY PADSTOW.

We have already noted that Roman pottery is said to have been found at Padstow (see preceding remarks on the early Christian monogram). On the opposite side of the harbour an important station seems to have been established.

Sir John Maclean describes this and remarks "the energetic Roman people were no strangers to Cornwall. They had a small settlement, of some duration, on the‡ side of Padstow harbour. Discoveries have from time to time been made upon the site, and it is probable that, were it not for the sand which has buried the whole area many feet deep, further evidences of their residence here would appear; for it is remarkable that no vestige of a Roman building has been brought to light." At this spot, in St. Minver, he adds, Roman remains have been found in abundance, also at Trevone on the opposite side of Padstow Harbour.

His description of its position is made clearer by his having had the spot marked in his inch-mile map of the district. He shews it as being at the head of a little stream between St. Enodock Church, the high ground at Rock and the tumuli on Bray Hill.

The stream flows from the Penmaine valley along the inner side of Bray Hill and out through a submarine forest-bed through the sands of the Dum-bar into Hell or Hayle Bay.

The station itself is 3 miles from the portion of northern coast road called Plain Street, mentioned in a former paper.

*Remarks by Rev. W. S. Lach-Szyrma, in *Journal Brit. Arch. Assoc.*, Vol. 83, p. 204.

† Mayhew's *Baal-Worship*, &c., *idem*, p. 203.

‡ In his account the word *western* (for *eastern*) is here by error inserted. *Hist. of Trigg Minor Deanery*, Vol. 3, p. 7.

Sir John has shewn that the present road from the north-east is the same as the ancient main road, coming down from Stratton, along the north coast, which passing through Endellion and by Boropark (perhaps, barrow or Bury-park,) and Plain Street, entered St. Minver, and proceeded in the direction of Pentire. On reaching that promontory it could go no further, except by turning or doubling about. It seems to have terminated amid surrounding intrenchments, friendly or hostile. The northern projection of the promontory, looking towards Tintagel (across $8\frac{1}{2}$ miles of Bay), is the fortified headland called the Rumps,* [Romans' Hold?] with triple mounds and ditches straight across its neck. Close by, at Trenant, near Pentire Glaze, we are told,† is another ancient triple earth-work; and on the adjoining high ground I notice Konderkep and Carruan. Both of these names may contain, in their derivations, some allusion to the confluent brooks below (dour and rouan, signifying water and streams), but it is also to be observed that, according to Dr. Borlase and Polwhele, *Caer-ruan* would as plainly signify "Roman Camp" as *Fort* of the rivers. This is a singular coincidence, if nothing more, since those writers knew not that their explanations of terms would be applied to a spot here, close to a Roman station. No one hitherto seems to have seen that the meaning of the Rumps and Carruan might be indicative that this was a Roman site.

We have stated that the great main road from Stratton ended on this Pentire promontory. The Roman station itself (a village?) was further to the south.

It was reached, Maclean says, by a branch road, which led off towards it about a mile west of the spot called Plain Street.

* For the derivation of these words, see the following :—

Tiz-Rûm,—Folk or men of Rome, Romans.

Reven-gour, Reveneur, Rouan,—Roman man, Roman.

Ruan,—Rome; the Irish is *Romh*; the Gaelic, *Riomh*; all derived from the Latin, *Roma, Romanus-a-um, &c.* (Dr. Borlase, Polwhele, Pryce, Williams, Bannister, and Dr. F. W. P. Jago).

Dr. Bannister gives, "*Carruan, Rocky-river or Castle on the River, or Ruan*,—Roman."

"*Rumped up*" is a Cornish phrase meaning roughed up, cast up into ridges or in a heap; hump-backed, &c.; therefore perhaps the series of humps or mounds here may have caused the place to be called the Rumps.

† "*History of Cornwall*" (Lake, Truro), Vol. 3, p. 371.

This branch-road passed by Maesmere through Treglynes and (just below Rose-arow) crossed the stream (which flows out at Polzeath), and thence tended over the hill in a direct line to the Roman station or colony. The road can be traced on the crest of the hill, south of Trenean, but on the western slope, near the Roman station, and at that place itself, the land has been overwhelmed by sand from the sea.

From this description it will be perceived that the ancient settlement would be found concealed behind Bray* Hill (with its barrows), when approached from the chief entrance of Padstow estuary. It lay between what is now St. Enodock, Bray Hill, and Rock. From Rock to Padstow a ferry has existed from a very remote time.

Tradition asserts that, in the place we have been describing, "the drifting of the sand was so sudden and violent, that in 2 nights many houses were covered; in confirmation of which, some have been discovered, like those of Pompeii, with the furniture in them." Another account relates that "a village was buried in the little valley near St. Enodoc's Chapel:" and that is the very place in which the Roman station was situate. Again, we read,—“In St. Minver, a town stood between St. Michael's and St. Enodoc; and in 1778, in consequence of the shifting of the sand-hills, a chapel and cemetery were discovered, many slate coffins and human bones being exposed. Spoons, utensils, rings, and other ornaments were found, together with a quantity of English coins† of various reigns, especially from Henry I to Elizabeth; several of the coins were in the possession of the late Rev. W. Sandys.” This would shew that the spot was occupied down to a late period. On the site of the Roman station the remains of a tumulus when opened yielded evidence of a cremated burial.

Bray Hill seems to have been an ancient British place of sepulture, and some of its contents have been regarded as Anglo-Saxon. One of its barrows contained a British urn, with zig-zag adornment and burnt bones. Some bodies buried in the hill were laid out with rude slabs of slate for coffins instead of

* Brea or Bre, means hill; so this present name is bi-lingual.

† Hist. of Cornwall, Lake, Vol. 3, p. 370.

being otherwise encased. I have seen many of them projecting from its slopes.

A succession of races seems to have dwelt upon this spot,—and some of the relics and interments may have had their origin in shipwrecks.

The following articles,* supposed to be Roman, according to Sir John Maclean, have been obtained from the sands in which the ancient station lies buried :—

COINS :—Gallienus (A.D. 260-8).

Constantine I, (A.D. 306-337).

(Two coins struck to commemorate the building of Constantinople, which city was solemnly dedicated in 330).

„ Various others.

BRONZE :—Ornaments, perfect, and in fragments.

Fibulæ (one representing a bird).

„ (another, small and penannular).

„ various others.

„ Tweezers, with two short pieces of

„ Chain, attached.

„ Nails or studs.

„ Various other objects.

BEADS :—Blue

Variegated. } of usual Roman type.

POTTERY—Samian Vases (fragments).

„ Rims and handles of red ware.

„ „ grey „

„ „ cream-colored ware.

„ Small vessels with nearly pointed bottoms.

„ Other vessels also in abundance.

GLASS :—Vases } light-green, amber, violet-blue.
Bottles }

„ Various fragments, thin, clear, and of good quality.

A pink coral necklace formed of short pieces, almost in natural condition, pierced for being strung, was found also, and has been regarded as probably British.

* Hist. Trigg Minor, Vol. 3, pp. 7—8. It is added, “ In the collection of the late Mr. Thomas Kent, of Padstow, now in the possession of his daughter.”

The occurrence of the quadrate camps midway across two important parts of Cornwall, the existence of the coast station, the association of relics connected with them, the extensive finds of coins, nearly new, in large quantities (of a particular class suitable for soldiers' pay) near various creeks, &c., the uprearing of Imperial and other Roman inscriptions, the vast character and great number of earthworks, many British, some yet to be identified as Roman, the warlike significance of the designations of certain localities, the directions of the roads, the discovery of Roman urns and other objects, and simple interments without urns or cairns in tumuli near the camps, prove, I think, that at least occasional hostilities and a constant readiness for war, with some kind of continued dominant occupation, prevailed throughout our Western region when the coercive Roman power was cultivating our British instincts, patronizing our commerce, and trafficking in our copper, lead, and tin.

Whether the invaders found good extended tracks already made by the Britons, and sufficient for their purpose, or not, they evidently used, if they did not construct, the main lines of Cornish roads; and they seem to have applied their own terms to certain portions of them.

All this would indicate that Cornwall, in the matter of road construction as well as in other respects, received the benefit of Roman acquaintance resulting in some kind of improvement, and perhaps in some localities this took the practical form of manual labour performed by the troops, either in the repair of ground to form a "plain street," or via, or in the building or altering of a bridge.

As much as this, I think, follows from our investigation, as far as it has proceeded; although no definite opinion can yet be given as to whether or not the Giant's Hedge, the St. Agnes Kledh, and the main roads were made by the soldiery of the empire.

ROMAN AND LATER INSCRIPTIONS, &c., YET TO BE DESCRIBED.

We commenced this paper by noting certain discoveries of Prehistoric remains in Cornwall, including Rock-marks, Celtic urns and their curious contents (the unique cup, weapons, &c.); and we have since, given some details of early Roman traces.

We have treated of the following :—

Roman Camp, No. 1 (Tregaer) its relics and probable supports,
in Central-East Cornwall.

Roman Camp, No. 2 (Bossens) its relics and probable supports,
in Central-West Cornwall.

Also some other Forts, probably Roman.

The Roman Station (by Padstow) its relics, &c.

Next :—The Imperial Roman Inscribed Stones must be examined
in detail.

Whether they were military or were merely proclamatory we shall have to consider ; also, whether the first discovered, which now stands at St. Hilary, is inscribed to Constantine I or II, and what really is its correct reading.

I have specially visited it, with this object in view, and have succeeded* in obtaining some important elucidations of letters hitherto regarded as doubtful.

There is nothing uncertain about the lettering of the one I have found at Tintagel, but in some respects the stone and its associations are so remarkable that special space must be devoted to a consideration of them.

The present paper has already exceeded ordinary limits, therefore I will defer, for a subsequent issue, my description of the :—

ROMAN, ROMANO-BRITISH, ANGLO-SAXON, NORMAN and other MEDIEVAL	}	Inscriptions, &c.,
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which I hoped to have been able to include here.

Before closing, however, I will just quote the lettering which I have succeeded in deciphering on :—

(A) The Tintagel Roman Stone.

(B) The Pendarves Anglo-Saxon Altar-Slab.

* By means of rubbings, casts, nocturnal lamp-light variously applied, and other means ;—the Vicar of St. Hilary, Rev. S. Kingsford, and the members of his family kindly co-operating with me. Mr. Arthur J. Langdon had previously placed in my hands a very successful rubbing, which he, with more than ordinary skill, took of the lettering ; this also I have found very helpful.

(C) The Lanhydrock „ Bell [re-cast (?) with old legend repeated and reversed],
—which three legends have hitherto been unread.

ROMAN.

(A). On the lich-stone upon the central block of masonry between the “grid-stiles” at the eastern entrance of Tintagel churchyard :—

.....	}	“ Imperatore
IMP C G		Cæsare Galerio
VA [L]		Valerio
LIC LICIN		Liciniano Licinio.”
		(A.D. 307—324).

ANGLO-SAXON.

(B). On the Altar-slab (now used for supporting a sundial) in the grounds of Pendarves, and formerly at Treslothan :

æGURED	}	Ægvred :—
		equivalent to
		Ægvred or Ecfrid.

The name is in a panel, the letters u and R are in ligature. The stone is thick, and is adorned (like that at Camborne inscribed for LEUIUT or Leviut) on its upper surface with a central cross and Greek-fret border.

(C). On the old Bell, removed from Lanhydrock church tower to make room for the hanging of a new peal, and now preserved by Lord Robartes at his mansion :—

æthelstan sumpta	}	A bell-legend, in jingling
an[ima] sua		rhyme ; reproduced on the
		bell when it was (?) recast in mediæval times.

The letters are set backward, with inversions, and are arbitrarily spaced, without uniform distances being observed,—some being in solid groups, others separate, and those in brackets omitted. The whole legend is reversed ; it surrounds the haunch of the bell in one line ; th is expressed by the usual single rune, and the name is perhaps spelled ætholstan.

[Particulars of these and other Inscriptions, &c., are reserved for our next issue.]

ALL

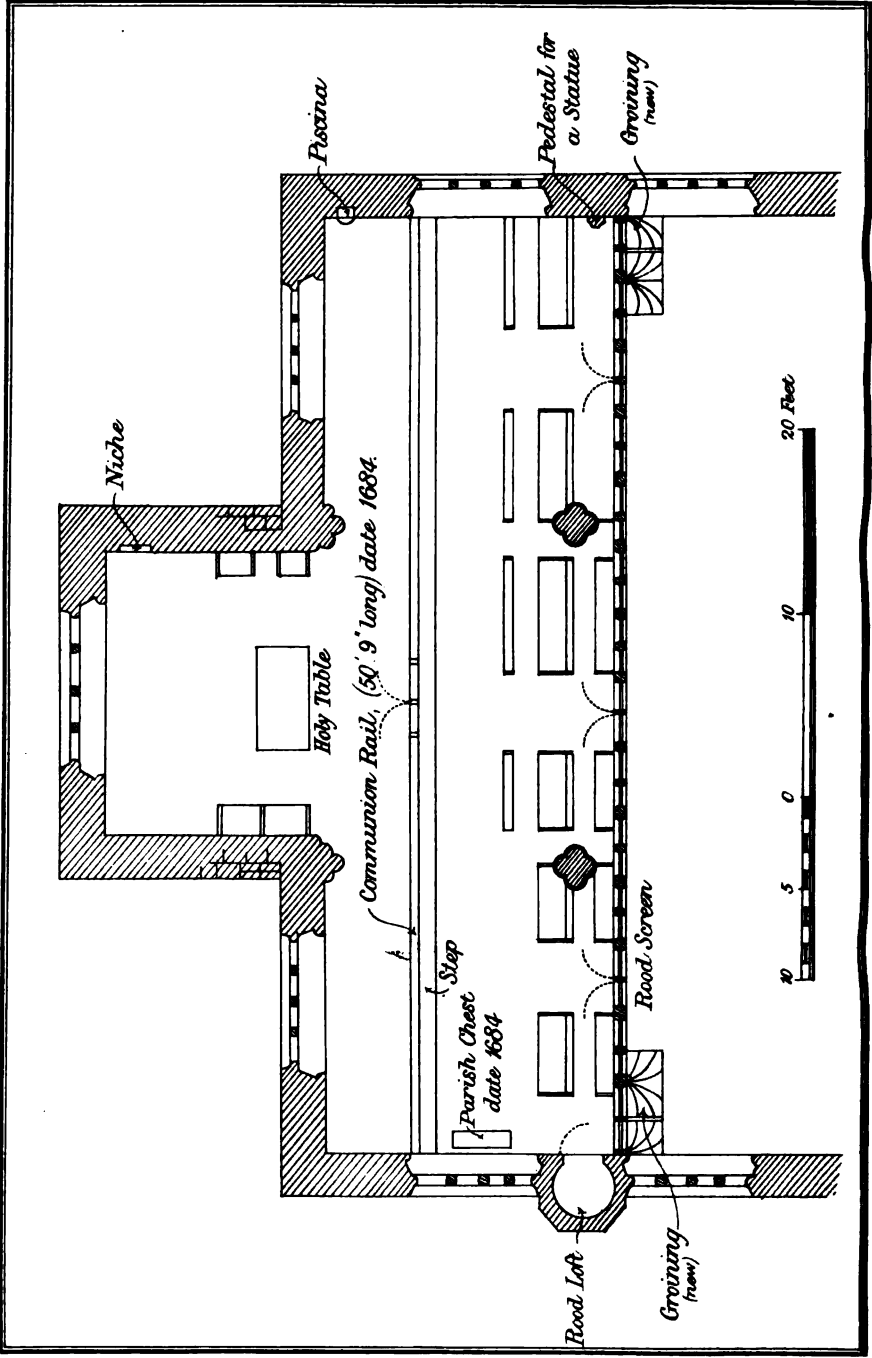
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PLAN OF CHANCEL: ALTARNON CHURCH.

ALTARNON CHURCH.

By the Rev. A. H. MALAN.

The paper on Probus Church and Tower in the last number of this Journal, naturally suggested the desirability of illustrated notes being furnished in reference to those two towers which come next to Probus in altitude, and sundry other Cornish churches, the architecture of which is noteworthy, and has not yet been described in these pages. Some information, therefore, regarding Altarnon church, it is the intention of the present paper to supply.

If mere elevation only were concerned, Fowey church should have had the precedence of the series, being 126 feet high as against 123 for Probus, while Altarnon tower is but 109 feet; but then in point of symmetry and richness of detail Probus rightly ranks far ahead of any high-towered church in the county. Indeed, the tower of Altarnon is plain in the extreme, and totally devoid of any beauty or artistic merit; its height has not even the advantage of rendering it a landmark, since it is completely hidden from most parts of the elevated moorland of the parish, while it would seem rashly to attract visitations of lightning to a greater degree than a tower more in proportion with the rest of the building. And that this is no idle supposition may be gathered from the fact that it has already been struck on two occasions; once in 1791, when one of the pinnacles was injured; and again in 1810, when a similar accident occurred—"the broken pinnacle carrying with it a great part of the battlement, and crashing through the roof: the tower being also much shattered by the same storm."

This church is dedicated to St. Nonna, or Nonnita (the mother of Saint David of Wales), concerning whom, and the connexion of the name with an inscribed stone at Tregony, some interesting remarks may be found from the pen of the late Dr. Barham, in these Transactions, Vol. II, 1866. As regards the spelling of the name of the parish, the last syllable is usually now written *nun*, but this is not in accordance with ancient

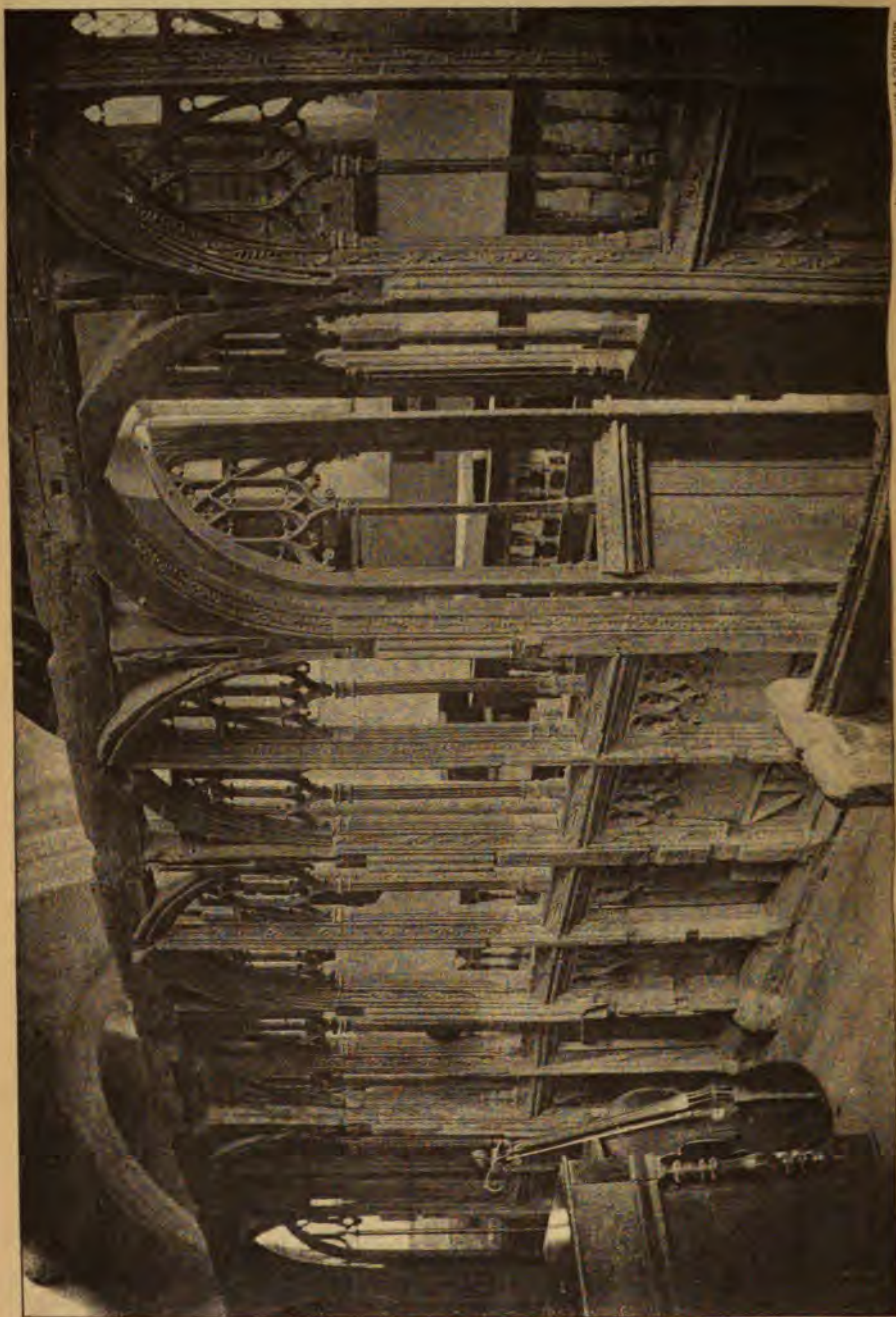
custom ; for in the Registers, until recently, it was invariably spelt *non* ; and referring to this matter, a MS. letter of Mr. Lysons contains these words :—"All the records of very early date—the Bishop's Register in the 13th century—the old Valors and taxations,—agree in the spelling of Althernon : the fact is Carew is wrong in the spelling of the saint's name, as all the writers of saint-history call her saint Nonnette."

An incidental example of the identity of Cornish and Welsh ecclesiology is shewn in the juxtaposition of the buildings dedicated to mother and son ; for just as near St. David's Cathedral there is St. Non's Well, so here Davidstowe adjoins the parish where is the St. Non's well alluded to by Carew. But it must be observed that nothing remains of that rectangular enclosure referred to by him, of sufficient area to topple an epileptic patient bodily into it—to recover (or drown) as best he might ; all that is left being a narrow three-sided piece of low walling about the size of and resembling an ordinary road-side well, bereft of water through draining the meadow-land hard by, and, till recently, exposed to the ravages of cattle. A covering-stone has now been provided and set in place, the walling repaired, and the corner of the field in which it lies, adjacent to the Sanctuary meadow, fenced off to preserve the *genius loci*.

Turning a moment to ancient history, "Curiosus" (Dr. Geo. Olliver) wrote an article which appeared in the *Exeter Flying Post* in 1852 upon this parish, amongst other things giving a list of Vicars from 1261 to 1842 : the following is taken therefrom ;—"Althernon, supposed to be the Penponta of Domesday, the largest parish in the county (15,014 acres), was granted to Robert, Earl of Mortmain and Cornwall, by his uterine brother King William the Conqueror. This nobleman married Matilda daughter of Roger Montgomery, and dying in 1091, left a son William, successor to his property. The young Earl became the founder of S.S. Peter and Paul's Oluniac Monastery of Montacute in Somerset, and amongst other of his possessions in Cornwall, endowed it with S. Neots, the Rectories of Althernon, Elerky, Carentock, St. Cariock, and the Bailiwick of Pennard. When Henry I seized the crown, the Earl espoused the cause of the Conqueror's eldest son Robert, and for so doing he was outlawed, and his estates forfeited ; still, it appears Henry suffered

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NEW PHOTOGRAPHIC ARTISTS & PHOTOGRAPHERS

ROOD SCREEN, ALTARNON CHURCH: BEFORE RESTORATION.

the above-mentioned donations to Montacute Priory to pass unmolested. With respect to Alternon, Prior Mark and his convent of Montacute transferred their rights in its church to William Briwere, Bishop of Exeter, in July, 1236, and in the following year the Bishop granted its appropriation to his Dean and Chapter.*

"From a survey of the parish in 1281 we discover that the service-book of the church (ordinale) was good and sufficient, *i.e.* after the Sarum rite—that it contained a life of St. Nouna, *Vita Sancte Nounne*. William of Worcester, quoting the calendar of St. Michael's Mount, affirms that her remains lay within the parochial church of Alternon—*jacet apud ecclesiam Villae Alternonias*.

"A chapel at Nonnestonys, in this parish, was licensed by Bishop Stafford, 18th Sept., 1400. From this parish sprang the ancient family of Trelawny. To John Trelawny and his wife Matilda had been conceded, in 1400, the privilege of an oratory at Trelawny, Treganek, and Woleston."—Thus far Dr. Oliver.

The festival of the patron Saint was kept on 2nd March, the day after St. David died, about the year 544 (according to the legend of Bishop Grandisson), at the advanced age of 145. This advanced age was supposed by Hals to have been exceeded by one Peter Joll, a native of Altarnon; but it appears the latter must be regarded as a mythical personage, for in replying to certain questions put to him by Mr. Lysons, who was seeking material for his county-history, the then vicar, Mr. Hart, wrote thus:—"the family of Joll, though not *remarked* in the Registers, are *remarkable* for their longevity; and this circumstance

* And the Dean and Chapter declared (1237) that they accepted "from the Bishop with the concurrent consent of Abbots of Montacute and Cluni, the church of Alternon, with the burdens nevertheless underwritten; (1) to provide for a perpetual Vicar a sufficient maintenance from the profits of the church without any difficulty, so that the Vicarage shall not exceed 5 marks; (2) to pay 24 Vicars of the Cathedral Church of Exeter 12 marks, and to the 12 clerks of the second form 6 marks, and the 14 boys of the third form 7 marks yearly.....who shall diligently and devoutly assist in the daily mass of the Blessed Virgin; (3) to preserve the anniversary of Lord William, Bishop of Exeter, giving each Canon present 4 pence, each Vicar 2 pence, and all the rest in the choir of second and third form 1 penny; but clerks and boys in the third form a single farthing."

gives some countenance to Hals' account of the great age of Peter Joll. The only remaining one of the family is a woman eighty years old, who seems likely to live several years. She tells me that she had two aunts—of the family of Joll,—who lived respectively to the age of ninety; and that four George Jolls, father, son, grandson, and great grandson, have attended divine service in Alternon church at the same time. But it must be observed that this old woman had never heard of Peter Joll.”*

A general glance outside shews the church to have nothing particularly noticeable; it is of the usual three-aisled type; granite ashlar-work, mullions, and jambs; three-light perpendicular windows; no buttresses, but walls splayed with a batter instead; the building material partly granite, partly killas, and partly ventrigan,—a kind of tufa, used in church work prior to Polyphant stone. The tower is of three stages; embattled, with crocketed pinnacles; up to second string course, including west door and window above, of transition Norman; third stage perpendicular. The north and south porches have good square-headed granite doorways with pedestals for statues above; open oak roofs, bossed; wall-plates carved; stone benches on either side.

But the moment the sacred building is entered it is seen to be an exceedingly good specimen of a Cornish 15th century church. Here we see the usual granite arcades of 4-centred arches; pillars, each a monolith of moorstone; chancel and chancel aisles cut off from the body of the church by a rood-screen; 15th century bench ends, elaborately worked, in profusion; north and south doors; no vestry. Here, too, we see the usual wagon-roofs of oak, with wall-plates carved in vine and scroll work, with bosses at the intersection of the purlins and rafters: also with the usual accompaniment of walls thrust out of the upright—the north towards the north, the south towards the south. For the collars of the rafters being set high up, so as to clear the sweep of the braces forming the wagon-work, and the braces themselves being in four lengths, cut short at each

* There is an ancient dame now living in the parish who *must* be 100 years of age, if not more; and who retains her faculties in a wonderful way. Upon my asking her if she knew a certain person who died recently, aged 91, she said—“I knew her well: she was a bit of a girl when I was a young woman.”



IRVING PHOTO, SPRAGUE & CO LONDON

FONT, ALTARNON CHURCH.

purlin, it results that the very arching which gives such vaulted dignity to the roof is attended with conditions eminently favourable for the rafters to spread themselves; and when there is taken into consideration the thinness of the walls (often hollow) compared with the weight to be sustained, and the absence of any buttresses, it ceases to be matter of surprise that in Cornwall wagon-roofs and upright walls are seldom found together.

The tower-arch may be described as a fine semicircular-headed transition Norman example, with small caps and bases. The font is also of late Norman, three feet square, with large heads, painted, at each corner; wheels of six spokes, each embraced by two serpents as supporters in the spaces between; octagonal shaft; circular plinth (modern); cable moulding round base of bowl; the top of the bowl having diagonal mortices, presumably for the tenons of the stone canopy with which Norman fonts are said to have been sometimes furnished. This is the largest of a series of similar fonts in the district; instances being seen at Laneast, St. Thomas (Launceston), Warbstow, Jacobstow, and perhaps other places. The only other Norman work is a piscina (see "Notes,") and a fragment of a tympanum, with star and circle-work; suggesting the thought--What an astounding amount of Norman carving must have been destroyed when these 15th century churches were erected on the sites, or ruins, of previous buildings!

Everything within the rood-screen is considered as being the chancel. This is according to the Cornish style in churches of this period, where there is generally no break for a chancel proper, and the only line of demarcation is, or was, the screen; consequently where a chancel has been protruded, it may reasonably be suspected to be of later date. In the present case an examination of the outside walls tends to confirm this view, seeing that the side walls of the protruded chancel (see *Plan of Chancel*) are not bonded to the east walls, but are built against them, shewing more recent structure; and one would be disposed to say they were built when the communion rail was added, in 1684,* and the eastern wall of the chancel-aisles was originally

* For some "Remarks on Parson Ruddle and the Botathen Ghost," see *Transactions of the Pensance Nat. Hist. and Antiq. Society*, 1888-9.

continued in one run right through from N. to S. But a report drawn up by the architect to the Ecclesiastical commissioners, in 1865, in reference to the repairs for the fabric within the screen, for which (as great tithe-owners), they are responsible, throws some doubt upon this. For in that report it is stated:—"the only indications of earlier work than the first half of the 15th century, are to be seen in the east walls of the chancel proper, in which the jambs of a 13th century window can be discovered on either side of the present opening." There are no traces of any such jambs now, but if they existed then, it would appear that the extreme east end formed the chancel of a 13th century church, against which the 15th century walls were built; and upon this hypothesis the absence of bonding may be accounted for by the repairs to side walls of "protruded" chancel being carried out in an unworkmanlike manner, in 1865, when the church was restored—and well restored—during the ministry of the late Mr. Tripp. In the east window is a piece of ancient stained glass said to be a representation of Saint Non; it might be a representation of anybody! The piscina in the south chancel aisle is clearly *in situ*; this is not the pillared one referred to in the "Notes."

The Holy table has stood, as shewn, from time immemorial. A mural painting shews the Lord's supper being administered by the celebrant, who stands on the east side of the table—on which are two lighted candles, a chalice, and two dishes with small loaves—facing west, with a male figure on either side of him, while two figures kneel in front of the table, facing east: an arrangement only possible when the table is clear of the east wall. Another mural painting depicts the crucifixion, the Saviour's side being pierced by the lance of a soldier, whose helmet corresponds with the armour worn circa 1620. This, therefore, may perhaps be considered the date of the paintings in question.

There is no evidence of any cross screens (parclose) having ever existed, and it may be confidently asserted that prior to its recent restoration (1888), the rood screen had in no way been tampered with, beyond being cut to accommodate modern box-pews, as seen in the accompanying print; except at the Reformation, when, in common with other screens, its groining was



INSET PHOTO, HERIAGE & OF LONDON

BENCH ENDS: ALTARNON CHURCH.

destroyed, and the carved work thereof broken down with axes and hammers. When the church was restored, in 1865, it was rightly decided to do the *necessary* work well and thoroughly, and to leave the screen untouched. Had the screen been then removed,—as forsooth being more or less dilapidated, and having witnessed Roman Catholic ceremonies upon its gallery in by-gone days,—and this happened in a church, which shall be nameless, restored about the same time—an exuberance of Puritanical zeal would have robbed posterity of “by far the finest specimen of 15th century wood-work in Cornwall, and one of the very best existing examples of perpendicular oak-work in England.” To guard against such a fate hereafter, when time should have made it more shaky, it was resolved to augment a small nucleus-fund, already in existence, and restore the screen as a memento of the jubilee. Mr. Harry Hems had provided two designs, (1) with groining, and (2) with new tracery in spandril spaces, relieved by a cornice. The latter course was out of the question; tracery should not be placed where tracery had never been; existing material should be restored, and any lost tracery renewed, but the spandrils should be plain match-boarded, so that, if desired, groining might be added in time to come, without rendering useless such tracery as would have been inserted in the spaces it ought to occupy. This was accordingly done. But, as the work progressed, it occurred that though the screen had borne, on the face of it, abundant evidence, by mortice-slot and dowel-hole, of previous groining, yet, when the spandrils were boarded over, such evidence would be obscured; and, therefore, to shew that the jubilee restorers knew their business, it was decided to groin $1\frac{1}{2}$ bays at either end, and to leave the extremities of cresting, etc., unfinished, as a gentle hint to aftercomers in what direction their superfluous funds might be expended. Groining, of course, but of a simpler kind, ought to be added on the other side of the screen as well; and then the completed gallery would form a commanding and suitable pulpit, from which the sermon might well be preached, when the church is filled with its four or five hundred worshippers, at harvest thanksgivings and like functions.*

* A print is given of the screen before Restoration, because the anatomy is better seen than would be the case, if it were shown as restored.

Within the memory of those now living, an oak statue of a saint—perhaps the last of a series—stood on the top, but not in the centre, of the screen; this must have been placed there subsequent to removal of groining; it fell to the floor in fragments through natural decay and that corroding burden of accumulated dust, which large numbers of bats, in successive generations, had kept sending down from the interior of the roof. Dust, indeed, where it settles and is allowed to remain, is a very potent factor in the destruction of ancient wood-work; the upper parts of the transoms of the screen, for example, nearly all needed new wood, whereas the under portions are sharp and good as when first worked.

The floors having been raised in 1865, so as to partly bury the sill, it became necessary to raise the latter in 1888, so that it now occupies the same position, in reference to the present floors, as it occupied to the original floors when first constructed—except that it stands back four or five inches farther east. The screen had never been painted, and some of the panels had never contained tracery: *why*, it is not easy to say, unless stalls came up close to those portions where the uprights and sill were left unfinished.

The bench ends, considering their age, are in an exceedingly good state of preservation, thanks to the care they have received in the shape of sundry applications of linseed oil. Even in a county where such things are not uncommon, they form a most valuable series—in number only equalled by those at Kilkhampton. They are of perpendicular work; 17 inches wide, 2 feet 9 inches high; each of a single slab of oak, accurately designed, and remarkably well executed; but they shew a great deal of repetition, as though the designers, having got hold of certain devices, endeavoured to ring the changes upon them to the utmost. The end next the Font gives the legend ROBERT : DAYE MAKER : OF THIS WORKE ; & WILLYAM BOKIMHAM CURAT IOHN : HODGE Ch.... M D.... ., the last letters of the date being obliterated; but “the seats were erected after Bishop Oldham’s time, who sat at Exeter from 1507 to 1523, for on one of them are the Arms of See of Exeter, as borne at present; but down to his death the sword, which is now in pale, was placed in saltire with the



IRN PHOTO. BRUNNEN & LONDON

BENCH ENDS: ALTARNON CHURCH.

keys." This would tally with the era of the Lewanick benches, —now, alas! no more—one of which was dated 1546. It is noticeable that there are no armorial bearings of any private family whatever; one would have almost expected the chevron and three laurel leaves of the Trelawnys to be present, yet their non-appearance is scarcely strange, seeing that the family had quitted their ancestral home a century before the benches were made.

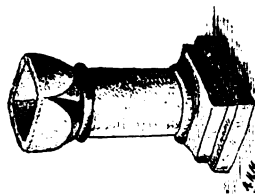
It would be rash in the extreme to enter into the symbolism of these ends. Some 'who know' have been heard to assign a distinct symbolic meaning to not a few of them—imagination can certainly do a great deal in this way: while others, who would be surprised if their opinion were not beyond question, have as confidently affirmed that the figures thereupon are nothing in the world but mere ornamentation, conventionally treated. To state facts and suppress theories is a safe method of procedure under such circumstances: let a simple catalogue, therefore, suffice:—

- | | |
|--|---|
| 1, 2, 3. A form of ornamentation, which may be described as being something like an Octopus, with two sets of tentacles diverging from a central body. | 11. Angel holding shield, charged with a heart, between two hands and feet. |
| 4. Angel, winged, with star on forehead; holding a shield charged with IH'C. | 12. Birds pecking blackberries on a flowing spray. |
| 5. Tracery and scroll-work. | 13. (Front.) Scroll-work—presumed sea-weed. |
| 6. Same as 1. | 14. Same as 1. |
| 7. Two human heads with fish-like bodies, one on either side of a stemmed fluted vessel. | 15. Two dragons; tails united by a cord passing round stems of two opposed vessels in centre. |
| 8. Human head and body, scroll-work for wings, arms extended, hands holding two tassels; body, from waist, merged into a conventional Octopus. | 16. Two fish,—open mouthed, with human head and body, armless and legless, between them—above birds and blackberries. |
| 9. Tracery above two dragons; mouths within rim of stemmed vessel. | 17. Panel tracery. |
| 10. Human body, holding decoration terminating in tassels, above half a medallion, with (?) horse's head. | 18. A winged cherub, resting on narrow orifice of vase-like vessel. |
| | 19. Panel tracery. |
| | 20. Two human-headed monsters; fish-like bodies. |
| | 21. Same as 16. |
| | 22. Same as 19. |

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| 23. Tracery above shield, as 11. | 49. *Arms of Exeter, post 1523. |
| 24. Same as 1. | 50. *Angel holding shield with dated legend. |
| 25. Tracery above two dragons, as in 9. | 51. *Harlequin in full costume. |
| 26. St. Veronica with shield charged with head. | 52. *Fiddler with plumed hat. |
| 27. Panel tracery. | 53. Two human-headed dragons with mouths on rim of a vessel, surmounted by human head. |
| 28. Tracery, with two hands in panels. | 54. Same as 11. |
| 29. Same as 1. | 55. Tracery forming two panels, (R) shield with H, (L) shield with wreathed saltire. |
| 30. Same as 16. | 56. Two dragons, mouths on rim of fluted vessel. |
| 31. Panelled tracery; two dragons in panels. | 57. Human head with arms holding tassels above two dragons with mouths on rim of vessel. |
| 32. Graceful flowering plant. | 58. Winged angel's bust above stemmed vessel; two dragons, head downwards. |
| 33. Tracery and two heads with protruding tongues—grotesque—above two human-headed monsters. | 59. (Front.) Human-headed monster. |
| 34. Panel tracery. | 60. (Front.) Same as 15. |
| 35. Same as 33. | 61. Same as 16. |
| 36. (Front) flowing decoration. | 62. Same as 15, but in two panels. |
| 37. Panelled tracery. | 63. Tracery above bearded human-headed monster. |
| 38. Human-headed monsters, opposed. | 64. Same as 11. |
| 39. Tracery above two panels, having (1) a shield with heart, (2) shield with two chevrons interlaced. | 65. Panelled tracery. |
| 40. Same as 16. | 66. Same as 58. |
| 41. Tracery above full figure of angel; hands crossed over breast. | 67. Same as 1. |
| 42. Same as 1. | 68. *Draped and hatted figure playing a bagpipe; with dog. |
| 43. Saltire, with flowing leaves between diagonals thereof. | 69. Sheep. |
| 44. Same as 1. | 70. Figure in costume (? sword-dance); sword thrown over right shoulder. |
| 45. Sea-weed scroll-work in two panels. | 71. Do., Sword held in left hand and raised above head. |
| 46. Flowing treatment of the mistletoe. | 72. *Man stirring contents of handled cauldron with stick. |
| 47. Tracery forming four panels. | 73. *(Front.) Man's head, hatted, on a fish or serpent's body. |
| 48. *Tracery above medallion with helmeted head. | 74. Sea-weed scroll-work. |

* Signifies the illustrations.

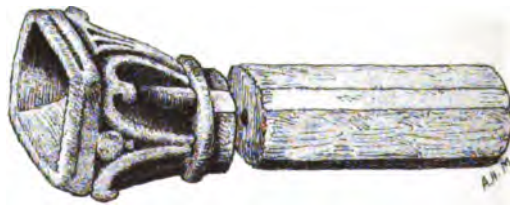




MUMBLES CHURCH.



ALTARNON



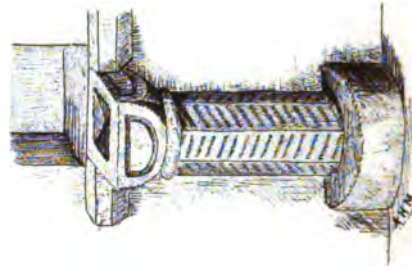
EGLOSKERRY



PERRANARWORTHAL



EGLOSKERRY.



- | | |
|--|---|
| 75. Sea-weed scroll-work. | 78. Panelled tracery. |
| 76. Same as 1. | 79. Cross with twisted wreath ;
three bosses at end of arms and
head ; base of cross resting on
a skull ; ladder on either side. |
| 77. Human-headed fish-like crea-
tures. | |

The only monument in the churchyard of more than local interest is the one, "Sacred to the Memory of Digory Isbell, who died 1795, . . . and of Elizabeth his wife, who exchanged earth for heaven . . . in 1805. They were the first who entertained the methodist preachers in this county, and lived and died in that connection ; but strictly adhered to the duties of the Established Church."

The parish chest conceals no surprising treasures. The Registers commence in 1688. There are the usual entries of those buried in woollen, and of the fees paid for vermin heads—kites, fitchows,* weasels, otters, and grays (badgers) ; the agreements and disagreements of parish apprentices with their masters ; and the strict injunctions to tything-men and constables to consider all persons attempting to effect a settlement in a fresh place as "rogues and vagabonds," and to treat them accordingly. The affairs of the body politic were managed by a parish jury of twelve men,—an extra-sized box pew, close to the screen, was assigned to their use—with power, when need required, "to nominate and choose others to be their associates and of y^e number of y^e twelve men, to do and to act in y^e management of y^e said parish as twelve men of ancient custom used to do : " and it is rather a pity this custom should have been allowed to lapse. Nevertheless, other usages of bygone days are still in force. The parish clerk, a *rara avis* of olden time, still survives, to repeat, with due solemnity, the various responses at the occasional services ; instruments of music, brass and string, help on Sundays to assist the voices, and supply the necessary volume of sound for so large a church ; the only obstacle to using, for the lessons, the Great Bible—dated 1701, and profusely illustrated from end to end with curious full-page engravings—is the inability of the present Lectern to sustain its massive proportions.

* A polecat was trapped at Trebartha, in February ; about the same date the papers recorded that the farmers of Lincolnshire were buying up stoats at 7s. 6d. each, to cope with the plague of rats in the stacks.

But apart from the parish chest, a packet of pamphlets and papers, labelled "Heirlooms of the Vicarage," is valuable and instructive; comprising Mr. Ruddle's account-book, a terrier and apportionment of the parish in 1613, sundry MS. letters of Mr. Lysons, Dr. Olliver, and Dr. Bannister, and other documents, as well as the researches of those who furnished answers to their several questions. The present existence of such material as this—collectively so helpful for the elucidation of local history—is but one of many indications that the Vicars of Altarnon have considered their office a post involving duties alike to previous times and to posterity. Banishment from their fellowmen has not resulted in that deplorable degradation of refined instinct which protracted exile unhappily engenders in occasional instances of the country clergy,—cases perchance more worthy of pity than of censure; but their aim has been to hand on their trust in a condition at least as good as, if not better than, they received it. And this aim has evidenced itself, not merely in the custody of the church, with its riches of antiquity, but even in such minute matters as the preservation of those papers—addressed to themselves as individuals, and never public property—which have considerably increased the facility whereby the present paper has been written.

A SHORT ACCOUNT OF ANTHONY PAYNE, THE CORNISH
GIANT; AND THE HISTORY OF HIS PORTRAIT,

(See *Frontispiece*)

PAINTED BY SIR GODFREY KNELLER, IN 1680,

And Presented to the Museum at Truro, by Robert Harvey, Esq., J.P., 1889.

His sword was made to match his size
As Roundheads did remember;
And when it swung 'twas like the whirl
Of windmills in September.—*Stokes.*

By the liberality of Mr. Robert Harvey, J.P., formerly of Truro, now of Trenowth and London, this Institution has just received an important addition to its museum in the form of a life-sized oil-painting of Anthony Payne, the Cornish giant of Stratton, painted by Sir Godfrey Kneller, in 1680. So far as is known, this is the only likeness of Anthony Payne extant; the engraving in Gilbert's "Cornwall" having been copied from this portrait. The engraver, besides other licenses, has done very little justice to the intelligent face which Sir Godfrey Kneller has given us in the original. The picture itself has seen such strange vicissitudes—the wonder being that it is in existence at all—that it is felt (by those who love Cornish men and antiquities) that it has happily ended them by finding a fitting resting place in the central and chief scientific Institution of Cornwall.

To Cornishmen, especially, there is much that is interesting about Anthony Payne. Not only was he a giant in bulk, but he was also so largely endowed with estimable qualities that we would fain re-tell the story of the man and the picture.

Anthony Payne, at twenty-one years of age, stood 7 feet 2 inches in his stockinged feet, and he grew two inches more afterwards, was large in proportion, comely in appearance, and witty—so quick of wit, in fact, that he was named "The Falstaff of the West." He was born at the manor house of Stratton, which is a small market town of great antiquity, within a mile and a half of the Bristol Channel, and sixteen miles N.N.W. of Launceston. He was the son of ordinary parents, who lived as tenants on the

estate of Sir Beville Grenville. As a lad, he was good-natured, lending his bent figure to the cutter-out in hop, stride, and over, or even, to the dismay of his mother, that stretch of cloth across his broad back for some young geographer to sketch thereon a map of the world. Yet his playmates were as kittens in his hands; in mere playfulness he would at times whisk off two of the stoutest of them, and one under each arm, clamber up to some perilous crag, and show them to their terror, the distant world. He was beloved by them; he was "Uncle Tony" at school; a proverb, "as long as Tony Payne's foot," still extant in Cornwall, probably came from the same source.

And this love for man and from man clung to him throughout his career. One feels pleased that the attachment of such a man was not only accepted but was requited. As a young man Anthony Payne was fortunate; he was sent to Stowe House, Sir Beville Grenville's, and he became the chief retainer of that gentleman. Famous old Stowe was in those days the centre to which many gentlemen sent their sons to be brought up with those of Sir Beville and Lady Grace. Stowe House had been the residence of the Grenville family for six hundred years, and its associations were of a very high character. It was Anthony Payne's duty to take especial charge of the outdoor education of the young gentlemen at Stowe. He taught them to fish, to shoot, and to handle arms; you can be shown to-day a great stone, near the now demolished house of Stowe, which is called "Payne's cast," which marks the place of his cast, ten paces beyond where the strongest players could "put the stone," when they used to play in the hurler's ground.

Then came the Civil War, when Charles I and his Parliament sought to settle their differences on the battle-field; in the main Devon going for Parliament, and Cornwall for the King. The cry of "Grenville's up," took stalwart knights, brave men, and raw recruits in plenty to Stowe, and Anthony Payne had the drilling and manœuvring of these. At one time Sir Beville had his head-quarters at Truro, but the great battle—we may say the only great battle—of the period fought in Cornwall, took place at Stratton (or Stamford) Hill, eight miles off Stowe, between Lord Stamford, for the Parliament, and the Cornish forces. The battle was a desperate one, the King's soldiers being outnumbered

but in the attacking position ; amidst them was Anthony Payne, mounted on his cob Samson, rallying his troopers and terrorising the enemy, who fled. A monument was raised to commemorate the scene of the battle, but the owner of the field, in later days, so resented the trespass on his land by sightseers, that he demolished it ; and a tablet was affixed to the Manor House at Stratton, the present Tree Inn, the inscription runs thus—

“ In this place the rebell army,
under the command of the Earl of Stamford, received
a signal overthrow
by the valor of Sir Beville Grenville
and the Cornish forces, on Tuesday, 6th of May, 1643.”

At the next pitched battle of Lansdown, near Bath, the forces of the King were defeated, and Sir Beville was killed. Anthony Payne having mounted John Grenville, then a youth of sixteen, on his father's horse, had led on the Grenville troops to the fight. The carrying of the sad news to Lady Grace fell on the faithful henchman, as did, too, the conveyance of the lifeless body of his master to its final resting-place among the honoured sires of his house, in the church of Kilkhampton, a village four miles north of Stratton. There the monumental tablet states—

“ Here lies all that was mortal of the most noble and truly valiant
Sir Beville Grenville, of Stowe, in the County of Cornwall.”

and then proceeds to relate his deeds, adding that he—

“ Was at length slain with many wounds, at the battle of
Lansdown, July 6th, 1643.”

The final victory of the Parliament, the execution of Charles I, and the restoration of Charles II, soon followed. With the return of monarchy came honours to the Grenville family, who had assisted much in it. Sir John Grenville was created Earl of Bath, and was made governor of the garrison at Plymouth, and he then appointed Payne halberdier of the guns. The King, who held Payne in great favour, made him a yeoman of his guards, and Sir Godfrey Kneller, the court artist, was employed to paint his portrait. That portrait, in his dress as a yeoman of the guns—a situation which he held during His Majesty's life—is the one which has now come into the possession

of the Royal Institution of Cornwall. Respecting Anthony Payne there is little more to add. He remained at Plymouth till Old Time pulled down the giant himself. On obtaining leave to retire, he went back to Stratton, where he died in the same house in which he was born. The floor* of the apartment had to be taken up to remove his remains, which were interred in a vault (according to Hawker) outside the southern wall of Stratton Church, July 13th, 1691, at an age which was little short of 80 years.

A few words respecting the picture. John (Grenville), Earl of Bath, took down the famous house of Stowe soon after the Restoration, and built on its site a magnificent edifice, which, after flourishing about half-a-century, was demolished, and has not since been rebuilt. In the great hall at Stowe this portrait of Anthony Payne had found its first resting-place, and when Stowe was dismantled, on the death of the Earl of Bath, it was removed to Penheale, another Cornish manor house of the Grenville family. But there the likeness of him who had done so much for the House was not valued, and was soon forgotten. Gilbert, the Cornish historian, in his peregrinations in search of material for his work, as Hawker† tells us, obtained‡ from a farmhouse on the estate, the portrait rolled up. The farmer's wife described it as "a carpet with the effigy of a large man on it;" it had been a gift to her husband by the landlord's steward, and she gladly sold it to him for £8. On the death of Gilbert, his effects were sold at Devonport, and a stranger bought the

* At the Tree Inn, Stratton (said to have been the head-quarters of the Royalists on the night preceding that battle) the hole in the ceiling is still shewn through which the corpse of Anthony was removed from the room in which he died.

† "Foot-prints of former men in far Cornwall," p. 41.

‡ On one of our rambles, while staying at an old inn at Launceston, Mr. Gilbert was informed by one of his travellers that he had learnt of an old painting representing the great Anthony Payne (a celebrated giant of Cornwall) being in the neighbourhood; Mr. Gilbert took me with him to see it, and on the discovery of its having been in the Payne family and an undoubted original,—(it was, however, in a very dilapidated state, full of holes and thick with dirt),—Mr. Gilbert consulted with me as to my ability to restore it for him. I undertook to do so, which occupied me afterwards full two months, and it was engraved as a frontispiece to his work.

H. P. PARKER.

Journal R.I.C., No. 22, p. 348.

picture for £42. This stranger was a connoisseur of paintings, who took it to London, and there, when it was ascertained to be one of the masterpieces of Kneller, it was re-sold for the sum of £800. It next appeared amongst the effects of the late Admiral Tucker, at Trematon Castle; and when the sale took place there, this picture was bought on behalf of a gentleman in Devon. The Rev. W. Iago, of Bodmin, did not lose sight of it, and advised the Royal Institution of Cornwall to acquire it if possible. Through his interest and that of Major Parkyn, of Truro, the possibility of the acquirement of the picture for the Royal Institution was brought about. The picture was purchased at considerable cost by Mr. Robert Harvey. Thus was afforded another instance of his liberality to this Institution, which is already indebted to him for the large Pozo Almonte inscribed stone; for the fine series of photographic views of the land which was his home for seventeen years; and for several other valuable donations.

A Bear's Weather.

The following letters relating to the weather in the neighbourhood of Truro during a period of twelve months, contributed to the press of the western counties from time to time by Mr. Henry Crowther, Curator of the Royal Institution of Cornwall, and received with considerable favour, the Council think deserving of a permanent record. They have therefore had them reprinted for issue in the present number of the Journal.

To those who have to take the state of the weather, as is done at the Royal Institution, Truro, and elsewhere, the rainfall of these last few days and other periodic rains are very interesting, though not unusual in hilly countries. Ordinary observers oft-times measure the rainfall by its inconvenience to their business ; but to the regular observer who—as is the case at this Institution—measures and tabulates it day by day, such a rainfall, as is now falling, is worth a passing notice. One often wonders if it be possible to get the general public to understand what all this trouble means about the weather ; it is such a come-and-go thing, apparently, that during heavy falls is perhaps as good a time as any to attract the public to what observations of rainfall mean.

By regular observations we learn that in Truro it rained in twelve days, in October, 1887, 4·45-inches (nearly four and a half inches), and that during last month it rained 2·04-inches, or a little over two inches in sixteen days ; this decrease is in part explained by the beautiful October we have had.

In November, 1887, it rained in twenty days 4·44-inches, and this month it has rained every day. In its six first days we have had 2·33-inches of rain in Truro. An inch of rain is equal to a little over 100 tons to the acre ; if we take the Truro district, as including Probus, St. Just, St Agnes, St. Clements, Kenwyn, and Kea, there have fallen on it in these six days over 21,042,000 (over twenty-one millions) tons of rain.

Or, again, from nine o'clock on Sunday morning last (November 4th) to Monday at the same hour, there fell, in Kenwyn and Kea, about 2,073,000 (over two millions) tons of rain; or close on 157 tons for each of the persons who live in these districts.

Truly there is something ponderous in the drops of rain!

November 8th, 1888.

We were quite pleased to see the interest which the short popular account of the rainfall of Truro excited. Weather certainly is a thing which all Englishmen agree is interesting; to many it is the Alpha and Omega of their conversation. The rainfall of November, 1888, was abnormal—if one may be allowed to use a biological term to express one's meaning for a meteorological fact. The rainfall, as measured at the Royal Institution, Truro, during November was 8·89-inches. If we take the rainfall during November for these last five years we learn that our average is 4·5-inches for the month; November, 1883, 6·15; 1884, 2·58; 1885, 4·86; 1886, 4·14; 1887, 4·44-inches, mean 4·43-inches. We had, to put it simply, 270 tons of rain more to the acre than any November these last five years. The year 1872 is known as the wettest recorded for 200 years, and the rainfall at Truro in November, 1872, was 5·96 (nearly six) inches. We may reasonably say, then, from such premises, that a rainfall of almost 3-inches in excess for the month was abnormal. This excess was slightly over 300 tons of rain to the acre, and the total month's fall was for those who live in Kea and Kenwyn, in Truro, nearly $17\frac{1}{2}$ millions of tons of rain, a monthly allowance of 1,320 tons, or, perhaps, clearer, 44 tons a day to each individual. Hence, hereabouts the brooks and small rivers overflowed their ordinary courses, and the water—like its brother element fire—was as ruthless in its destruction and mastery.

December 5th, 1888.

Popular opinion says that looking back on December, 1888, it was a dry and cold month; and that, like many other parts of England, we had a wet Christmas. This popular opinion seems to have been borne out too, by the fact that we had thirteen days on which there was more or less sunshine and eleven frosty days.

Our number of frosty days was a little above the average (9) for a Truro December, and was characterised on the last day by a frost which sank 9 degrees below freezing point.

Our December rainfall was 4·68-inches in nineteen days, about five-eighths of an inch more than December, 1887, and the heaviest rainfall we have had on a similar month since 1882. Popular opinion seems a little astray here. Now, during the last three months of 1882 we had exceptionally wet weather; in October it rained in 23 days, 6·04; November, in 28 days, 5·57; and December, in 28 days, 6·73-inches.

If we take the December rainfalls for the last 40 years, 1848-87, we learn that the downpour of rain was heavier on 18 and less on 22 Decembers than last month. It is somewhat curious that the 8th year in the decades for the same period are characterised by heavy rains, *e.g.*, December, 1848, 7·88; 1858, 6·11; 1868, 8·26; 1878, 6·17; 1888, 4·68-inches; and that about two years preceeding and following these periods we have the lightest recorded December rainfalls.

From the 16th to the 21st the barometer fell 1·28 (over one and a quarter) inches. The wind was gentle the first two days of this drop, on the 19th it freshened, and after a considerable increase was followed on the afternoon of the next day by a dead calm, the same night the wind blew very strongly and this continued throughout the depression of the barometer. During this fall of the glass one and a quarter inches of rain fell.

Our greatest heat was on the 3rd and 8th of December, 59 degrees; our coldest night December 30th, 23 degrees, a range of temperature of 36 degrees; no wonder that many people shivered, rubbed their hands and felt starved.

January 2nd, 1889.

The month of January opened with dry weather, which continued for the first seven days, and closed with rain, which fell on the last eight consecutive days. Every night of these seven dry days was frosty, one of them, the 3rd, being the coldest night in the month, the thermometer registering 9 degrees of frost; there were ten frosty nights during the whole month. The heaviest day's

rainfall was on the 8th, '68-inch ; rain fell on fifteen days, in four groups of consecutive days, namely 8th to 11th, 15th and 16, 19th to 21st, 26th to 31st ; yet, until the rainfall of this last group, we had a very dry month. Even with the continuous rain which saw January out the rainfall was only 2'71-inches for the whole month, or an average rainfall for the fifteen days it fell of '18-inch (a little under one-fifth of an inch). With the exception of that of last year (1888, 2'53-inches) last month was the driest January since 1882 (2'69-inches). The wettest January we have had since 1850 was in the Crystal Palace year, 1851, when it rained 9'58-inches, a difference shewing 687 tons of rain more to the acre than last month. We had little sunshine, some hail, and a transient fog or two. Our maximum heat was 50'1, our minimum 36 degrees, last year these figures were maximum 48, minimum 37'8 degrees, hence this year we had a slightly warmer month. Respecting outdoor observations they were of a most interesting character ; we came across fourteen genera and twenty-six species of wild plants in flower and many molluscs crawling that should have been hybernating. The birds were throughout the month very lively, and a glimpse in Rosedale, St. Clements, of a group of blue titmice, a flock of five long-tailed titmice, and a pair of paired great titmice was, with the hearty spring-time songs of thrush, blackbird, and lark, a sign that nature was *en evidence*.

February 2nd, 1889.

The first twenty-three days of February were more or less wet ; the last five, with the exception of a few flakes of snow on two of them, were fine, with plenty of sunshine. The dampness reached its culmination on the 14th (St. Valentine's Day), the air being so saturated that even the large Pozo inscribed stone—the gift of Mr. Robert Harvey—within the museum, dripped with dew. A fall of rain on so many consecutive days in February has been several times equalled at Truro during the last half century, and in 1854 rain fell on every one of the 29 days of this month, its total fall being 6'02-inches. The rainfall for February, 1889, was 2'82-inches, which, though our wettest February for four years, was below the average of 40 years of rainfall here, which is 3'39-inches. The average British rainfall for the same month was 1'61-inches. The

February of last year and of 1887 were unusually dry, the rainfall of the latter being only $\cdot 77$ -inch—just over three quarters of an inch—and of last year $\cdot 85$ -inch. How strikingly in contrast with the February of 1872, with its $6\cdot 98$ -inches, or nearly seven inches of rain ! But the February rainfall of last year was less throughout the kingdom than it had been for the ten previous years at the same season, and we can scarcely expect many successive repetitions of such agreeable dryness. Our total rainfall for the past two months of this year is $5\cdot 54$, same period last year $3\cdot 38$ -inches, or about 220 tons of rain more to the acre this year than last. We had during February snow on 15 days, hail on 6 days, 13 frosty nights, hoar-frosts, rain-bows, strong winds, and other meteorological disturbances. Yet the male flowers of the willow gilded over, and the hazels hung their tassels, the coltsfoot, lesser celandine, ground-ivy, herb-Robert, dove's-foot geranium, germander-speedwell, and a few others, in addition to those recorded in our January weather letter, burst into bloom, and the birds—wren and thrush alike—sang through it all.

March 5th, 1889.

The heavy rain, snow, and sleet of the early part of March resulted in the heaviest downpour here for twenty-two years (1867), when the rainfall in March was $5\cdot 44$; that of 1889 being $4\cdot 74$ -inches. Of the great damage, in the West especially, of this downpour the newspapers have given ample record. One of our heaviest recorded March rainfalls was in the Crystal Palace year, 1851, $7\cdot 11$ -inches. Our rainfall during March last year was little less than this month, but March, 1888, was throughout Britain more than $1\frac{1}{2}$ -inches above a ten year's average ; relatively, we are very much to the worse as regards rain this year, the total rainfall of the last three months being $10\cdot 28$, for the same three months last year $8\cdot 08$ -inches.

Our greatest barometrical height was $30\cdot 52$ -inches on the 16th, our lowest $28\cdot 90$ on the 18th, showing a range of $1\cdot 62$ -inches in two days. Our average greatest (maximum) heat was $52\cdot 6$, our average least (minimum) heat $35\cdot 7$ degrees ; our coldest night was on the 1st of March with 12 degrees of frost. Taking the month through, we had about equal sunshine and cloud, had frost on ten nights, snow on the 1st, 2nd (nearly one inch), and 3rd ; sleet on the 4th and 9th, and a very striking hoar frost on the 2nd.

We noticed sixteen additional species of plants in flower, our total of recorded flowers seen to the end of March being fifty species. Though on the 12th and 17th we saw flocks of peewits, and on the 12th a flock of starlings, a dead bird from which came into our hands in fine condition, the progressiveness of spring was everywhere apparent, the bulbed buttercups were on view with the pilewort, and the sloes were whitening their gnarled bushes; the humble bees were on their vital errands, and several of the early spring migrants carolled their best on hedge and tree. We are pleased to learn that so much interest is taken in these weather notes, but there seems to be an idea that we made Truro rather colder than it could really be last month, by recording so many days on which snow fell. This is perhaps due to the method which has to be pursued in registering snow. If less rain falls than one-hundreth part of an inch on any one day, we do not register that day as wet, as by agreement among meteorologists less than this does not constitute a rainy day; yet an amount of rain differing as much as $\cdot 01$ and $1\cdot 51$ (we use the figures thus for simplicity merely), or one and a half inches of rain, constitutes in each case a rainy day. An inch of snow measures about one-tenth that bulk when melted: hence small quantities of snow are not measurable as is rain, so that many records of snowfalls are often eye observations.

We may add that in Britain snow is scarcely ever absent from our sight, the brightest white clouds in the summer sky are probably ice-crystals displaying optical characters, which even beautify the dome of blue; such snow, hardened by the wind and falling as hail, exhibits therein either alternating bands of clear crystalline ice and duller snow, or central druses (forgive the word) like those in quartz nodules, common in many parts of Cornwall and Devon.

April 3rd, 1889.

It is three years since we had in Truro so heavy a rainfall in April; its total of $2\cdot 17$ -inches fell in twenty days, being, with three exceptions, all proverbial April showers. The sun shone on 24 days. The rainfall in April, 1888, was $1\cdot 63$ -inches, nearly half-an-inch less than the same month this year; and the rainfall throughout Britain was below a ten years' average also. We are still

going to the bad as regards the amount of rain which has fallen this year and last, January 1st to April 30th, 1888, total rainfall here 9'71; same period this year 12'45-inches, a difference of about 276 tons to the acre. We had a tremendous downpour of rain on the evening of the 6th, when 0'08-inch fell in ten minutes. The number of plants seen in bloom to the end of April was 65 species. In places the horse-chestnut, sycamore, beech, and hazel were in leaf. *Bibio Marchi*, the two-winged fly the meteorologist welcomes in the spring, we saw on the 5th, the swallow at Falmouth on Easter Monday, 22nd, at Truro on the 28th, and the swift on the 30th. We have not heard the cuckoo yet, but it was heard at Cuckoo Bottom, below Besore, Kenwyn, on the 23rd; locally this place, named after our spring harbinger, is notorious for being the place where it is first heard in this part of Cornwall, and so periodically, that many visitors frequent the valley on one set day every year for the purpose of hearing the bird's proclamation of "summer is coming," and are rarely disappointed.

May 8th, 1889.

During May we had 18 days on which rain fell, the total rainfall for the month being 3'61-inches, the heaviest May rainfall here for eleven years; indeed, during the last 40 years there have only been six wetter Mays, the average rainfall for the same period of the same month being 2'44-inches. May, last year, was unusually dry throughout Britain, being only '64-inch (under three-quarters of an inch), the average British rainfall for May being 1'78-inches. Locally, nearly one and a half inches more rain fell during that month than in April). Our total rainfall from January 1st to May 31st is 16'06-inches, the total rainfall for the same period in 1888 being 11'32, or four inches and three-quarters more rain this year than last.

We had no frost, our maximum heat in the shade being 63'6 degrees, our minimum 47'0 degrees. We had more or less sunshine on 25 days. Perhaps one may add best here that the country looks in splendid condition, and the grass is long and healthy. The hay harvest begins in this neighbourhood to-day on Newham Farm, near Truro.

We saw the martin on the 6th, and heard the corncrake on the 11th, but records a week earlier than ours have been sent to us. The oak was first in leaf (3rd), the ash on the 12th, nine days later. We have long had the rhyme ringing in our ears of

If the oak's before the ash,
Then you'll only get a splash,

&c., but one would like to get, before being frightened, better confirmation of this from recorded observations, for we are afraid that like many another popular saying its derivation is quite mythical.

June 5th, 1889.

Last month was dry and hot. Taking the June rainfalls here during the last 40 years this is the seventh as regards dryness. Our driest June was two years ago (1887), when only '05-inch—a very slight shower indeed—was registered on the 6th. At Penarth, about a mile from the Institution, this shower was not felt, and Mr. N. Whitley, a most careful and experienced meteorologist, has June, 1887, in his register as rainless. Our heaviest June rainfall was in 1860, when in 27 days 7'38-inches of rain fell. The wettest day in June was in 1877 with 1'92-inches, nearly two inches of rain on one day.

We had rain on ten days last month, with one exception in short showers. This exception was on the 19th, when a showery day culminated at 11 p.m. in a sort of tropical downpour, accompanied by thunder. It is somewhat singular that the thunderstorms which did so much damage throughout England in June, 1789, one hundred years ago, fell on the 19th. The total rainfall for June this year (1889) was '95-inch, not one inch, and of this '50, half-an-inch, fell on the 19th. As usual, at this season of the year, when, after sunset, coolness condenses the latent moisture in the air, the showers were mostly at night, and with us two-thirds were after 9 p.m.; we had not a shower on the morning of any day during the whole month.

It will have been noticed from our monthly weather letters that we have been gradually going to the bad as regards the comparative rainfall of this year and last; this June is a delightful exception. June, 1888, with its gales, remarkable rain, thunderstorm, and its rainfall of 3'36-inches, stands in unfavourable contrast to June

this year, which, too, had its remarkable rain and thunderstorm, but registered only '95-inch of rain. The total rainfall from January 1st to June 30th, 1888, was 14'68-inches; for the same months this year, 17'01-inches; whilst we were to the bad in May nearly four inches and three-quarters, we were only two inches and three-eighths at the end of June. As half-a-year has passed, perhaps the briefest summary possible may be interesting :—

Mean of British June rainfall (10 years)	2'48-inches.
„ Truro „ „ (30 years)	2'40-inches.
„ „ annual „ (30 years)	3'46-inches.
„ „ Jan. 1 to June 30 rainfall (1888)	2.44-inches.
„ „ „ „ (1889)	2'83-inches.

As mentioned in the last letter, we had no frost in May; this, and the dry warm weather since, have given us fine grass and a heavy hay harvest, and developed the seasonal phenomena 14 days or so before their general average. Wheat was in flower in Truro on the 15th; in 1887, the year of drought mentioned above, on the 23rd. In June, 1789, a century ago, wheat was in flower on the 4th in the eastern counties.

It is a somewhat singular thing that, though June of last year was so wet, the 15th was the hottest day here (87 degrees in the shade) during 1888. The hottest day this month was on the 27th, 83 degrees in the shade. We had sunshine on every day except one. The barometer was very high, the mean corrected pressure for the month being 30'007-inches, the mean maximum heat 70'6, and the mean minimum 50'9 degrees. Our coldest night was on the 3rd, 46 degrees.

The cuckoo was heard on the 23rd, and on the 25th we saw one pursued by a swallow. The cuckoo remains here usually till July; the records of when last seen and heard are very interesting.

The herbage here was rank; in one day's tour through the district around the mouth of the Helford River, on June 25th, we noted 210 different species of plants belonging to 48 natural orders, in flower. For a list, see the *West Briton*, of July 4th, under the heading "An English Garden of Eden." This is the year of foxgloves; men with long memories remember nothing like it.

July 3rd, 1889.

"A heavy hay harvest, with a good cereal harvest to follow, if the rain keeps off," may tersely express the present agricultural prospects. It is gratifying to record that 1889, so far, is drier than 1888. Up to July 31st this year 20·33 inches of rain fell; last year, during the same months, 21·13 inches, shewing nearly 1·25-inches, or about 120 tons of rain to the acre, less this year. A Penzance record gives the rainfall of January 1st to July 31st, 1888, at 21·45; a St. Agnes one, 19·60; and the average of Devon, 22·86 inches.

This year has been wetter in the earlier months and drier during June and July. A more unsummer-like month than July, 1888, is probably not on record. The cold, rainy weather of July was a continuation of what had been in the last week of June. In some places, in the first week, one to two inches of rain fell in thirty to forty minutes; in the second week snow fell over most of England, and frost was registered in the night. The rainfall in Truro was the heaviest for 27 years (1861); the rainfall throughout England was 81 per cent. above the average, the only districts which were about normal in downpour being North Cornwall and North Lancashire. During July, 1889, rain fell on 17 days 3·32; July, 1888, 6·45 inches, or over 3 inches of rain more last July than this. We had a sudden and heavy downpour of rain on the 13th, '33, one-third of an inch, falling in twenty minutes—2.20 to 2.40 p.m.

The prevailing winds were N.W., S.W., and N. The highest reading of the barometer was on the 1st, 30·45—the lowest on the 10th,—29·53-inches. On the last four days of this barometrical depression exactly half the rainfall of the month fell. The greatest heat in the shade was on the 7th, 82 degrees; the coldest night was on the 19th, 43 degrees, a difference of 39 degrees. Taking the average, however, for the month, July was remarkable for warm nights—52·6 degrees—which shewed a difference of only 17 degrees from the average maximum in shade in the day.

The acropetal growth of the foxglove enables one to judge, now that it has nearly done flowering, how favourable June and July were to it and kindred flowers. Mr. Jesse gave me a record of one 7 feet 3 inches high, with 9 lateral branches and 293 seed pods and blossoms. A specimen we came across near Ponsanooth was 7-feet 7-inches high, and had 166 seed pods on the main stem, the average number of seeds in a pod being 960.

The goldfinch, which is becoming scarcer in Cornwall, brought itself in record by hatching out a nest of young ones recently in Mrs. Paull's garden at Bosvigo, Truro.

Our nicest evening was on the 29th, no wind, temperature at 9 p.m. 63 degrees, jelly fishes in the river everywhere, the youngest and smallest of swallows just on the wing.

August 7th, 1889.

Singularly enough, the measured amount of rain which has fallen during the past month is exactly that registered for August last year, 2'92 inches, so that 1889 remains yet drier than 1888. There will be, we think, as regards Cornwall, a consensus of opinion that August this year is more unfavourable to cereal crops; yet August twelve months ago was accompanied by thunderstorms, sudden and heavy rains, and cold winds. The feeling of unfavourableness cannot arise from temperature, for their agreement on this point is as remarkable as their rainfall. The average of the daily temperature in the shade was 67'8 degrees, and the minimum (night) temperature 51'9 degrees, and the mean of these was within one-tenth of a degree of what it was last August. The explanation, we think, will be found in the delivery of the rain. Last August there were only twelve wet days; this month twenty-two. With the exception of a few days towards the end of the month, we had not two really dry days together. August, last year, was a month of cumulus clouds, which permitted to the country hereabouts one-third more sunshine; but this year it was one of nimbus clouds, which cut off direct sunlight. Bad as it has looked, however, we cannot call it a wet one: our mean annual August rainfall is 3'016, the average British rainfall, 2'71 inches. The wettest August we have had for nearly half a century was 5'84 inches, in 1877; and our driest '19-inch 1880.

We had a remarkable barometrical depression of nearly three-quarters of an inch between the 16th and 21st, as many of our seafaring people too sadly know. Our hottest day was the 31st—80 degrees in the shade; our coldest night the 28th—41 degrees. The range of temperature in the nights was 20 degrees—a difference which many people called frost, but no frost was registered with the thermometer. Like last year the wet caught the full foliage of the trees, and the growth of fungi and spread of autumnal

yellow were very apparent. Other signs of the approach of autumn were not lacking, but the most interesting was the bird evidence. At Truro on the 18th, at Gorran Haven on the 27th, and nearer the end of August at the Land's End, we saw flocks of swallows practising on the wing; at Porthcurnow large flocks of linnets, and at Marazion an immense flock of starlings.

September 4th, 1889.

It is twenty four years since we had so dry a September: the rain fell on twelve days, and the amount registered was 1'17 inches. In the same month last year the rain fell on eight days only, but the amount was rather more with us; whilst the British rainfall was the lowest for ten years, and one and three quarters of an inch below the average. The driest September in Truro for forty years was in 1855, '40-inch, under half-an-inch. As our average September rainfall is about three and a half inches we had a very favourable month as regards rain.

Last year, throughout England, September was bright and sunny in the day and cold at night. Our thermometers gave us last month an average of two degrees warmer during the days and two and a half degrees colder in the nights (maximum, 67'3; minimum temperature, 49'7) than September last year. Our warmest day was on the 12th, 78 degrees; our coldest night on the 26th, 35 degrees. Those instruments nearer the ground registered frost several times during the month. We had sunshine on 22 days.

We learn, then, that 1889 is still drier than 1888, its September nights colder, its days warmer, and that both agree in sunshine.

There were during the month great fluctuations of the barometer; the variations in height between the 16th and 24th inclusive being nearly one inch, 30'39—29'47 inches; by next day the glass had risen half an inch. The autumn is early, and in places narrow belts of cold winds have blasted the trees through. The young oaks were laden with bud-like artichoke galls, and the cherry and spangle galls burdened the leaves. The swift left us so far as our own observations go, on August 15th, but the swallow was still with us; last year the latter bird was seen here on October 9th. The month went out in a glow

of autumnal red, foretelling a bright to-morrow, and showed us, who would read, how highly penetrative were the red and yellow rays of light, which, together with blue rays mainly, make white light in the expanse of atmosphere we gazed up at.

October 2nd, 1889.

An average of forty October rainfalls here gives four and three-quarter inches of rain. Our rainfall last month, 5.43-inches, nearly three-quarters of an inch above the average, tells how wet the month was; yet, compared with many October rainfalls, it showed very favourably. In the same month in 1886 we had 6.26; 1885, 8.82; and in 1880, 9.23-inches of rain. During the last forty years we have had thirteen wetter Octobers, that is, one-third of them have had greater rainfalls. Our wettest day was on the 18th, 1.36-inches of rain. On the 16th of October, 1880, the fall was 3.0, three inches of rain in one day! Our average number of wet days in October is twenty; last month it rained on twenty-six days. We had four days of sunshine, nine on which the sun shone for a short time, chiefly in the mornings; and eight on which the sun was seen behind clouds, but not able to shine through. It was a month of battle between cumulus and nimbus clouds, which ended in favour of the later, as winds favourable to rain prevailed; in sixty-two observations no easterly, and twenty-eight north-westerly winds and gales were noted. The heaviest rains were in the night, but on the 8th we had forty tons of rain to the acre between 9 a.m. and 12 noon.

Our highest daily temperature was 65 degrees on the 3rd and 4th; our lowest 29 degrees on the 14th, 3 degrees of frost, the range of temperature was 36 degrees, the mean daily heat 57.7 degrees, the mean night temperature 41.8 degrees.

The highest reading of the barometer was on the 24th, 30.14, the lowest on the 19th, 29.16-inches, a range of .98, nearly one inch.

We had rainbows, gales, frosts, and one thick fog; how delightfully favoured Truro was compared to several great centres of industry visited by us in the north of England in October.

Generally, the trees put off till November their defoliation, starlings were flocking all over the country. We saw a kingfisher at Bosvigo on the 2nd, and Mr. Henry W. Hockin kindly drew our attention to swallows flying over Bosvigo Lane on the 31st, of which we saw three.

November 7th, 1889.

ASTRONOMICAL NOTES, 1889.

Comet e, 1889.

This Comet was observed on the nights of August the 16th and 17th, but unfavourable weather prevented any further observations.

On August 16th the night was not very favourable; fleecy clouds being scattered about, which prevented a careful scrutiny and eventually drew a veil of cloud over the sky.

The Comet was well seen with the Comet eye-piece giving a power of 24, and appeared like a ball of milky light surrounding a star-like nucleus, with a short wide tail reaching away in a following direction. Around the nucleus was a coma of milky light which faded away gradually.

The colour of the Comet was bluish white.

60 *Leonis*.

If previous observers can be depended on, this star is losing colour.

Birmingham includes it in his list of red stars* giving the colour as red—Schmidt being the authority.

In Mr. Chambers' working catalogue of red stars† the colour is given as pale yellow, whilst three independent observations of my own record the star as white.

Mr. Chambers has also favoured me with other observations of this star, and collating the whole, I find we have the following result :—

DATE.		AUTHORITY.		COLOUR.
1872	..	Schmidt	..	Red.
1877	..	Chambers	..	Pale Yellow.
1884	..	Gage	..	Light Yellow.
1885	..	Gemmill	..	Yellowish.
1885	..	Espin	..	Yellowish White.
1886	..	Chambers	..	Yellowish White.
1888	..	Chambers	..	Yellowish White.
1890	..	Whitley	..	White.

*Trans. Royal Irish Academy, Vol. 26.

†Monthly Notices Royal Astronomical Society, Vol. 47.

If personal equation in the estimation of colours, and the influence of different apertures could be disregarded, we have here clear evidence of a star changing its colour from red to white, in a period of eighteen years, but my own experience inclines me to accept any such deduction with caution—although had this series been made by one experienced observer the evidence would have been strong in favour of change.

95 *Herculis*.

This double star deserves careful attention, from its suspected change of colour.

Its normal tints are Pale Orange and Pale Green, or, as Admiral Smyth calls it, Cherry Red and Apple Green,* but in his "Sidereal Chromatics" he considers that it undergoes marked variations of colour, and, that the evidence he brings forward completely proves this, the most remarkable instance being the observations of Captain Higgens, of Bedford, made with a 4-inch Cooke Refractor, in 1863, when the stars changed from white to the normal tints in the three months from May to August. Sir G. B. Airy suggested that the simultaneous change for the two stars is suspicious, and looked like a possible change in the telescope, and Franks states that most subsequent observations confirm Smyth's colours.†

There is, however, further recent evidence of colour change in this star. In August, 1885, I noted this pair as being both silvery white; on September 13th, both yellowish white, with no difference of colour between them; on September 24th, both same tint, very pale yellow, certainly not white; but on October 4th, the colours were very pale yellow, very pale green, with a noticeable contrast of colour between them.

Throughout the present year the tints have been the normal ones—pale orange and pale green.

The foregoing observations were made with the Taunton Refractor of $3\frac{1}{2}$ -inches aperture, by Cooke & Sons.

H. MICHELL-WHITLEY.

*A Cycle of Celestial objects, 2nd ed., p. 509.

†Astronomy for Amateurs, p. 259.

NOTES AND QUERIES.

The Editor will be glad to receive short Notes on Discoveries, and occurrences of interest, relating to the Antiquities, Geology, and Natural History, &c.. of the County, for insertion in this portion of the Journal.

No. 1.

Earthquake in Cornwall.

On Monday, October 7th, at about a quarter to Two p.m., a shock of earthquake was felt in the district extending from Doublebois to Boscastle.

At North Folly farmhouse, about a mile from the Doublebois Railway Station, the shock was felt severely, the house seemed to vibrate, the crockery rattled, and some small articles were thrown down and broken.

It was felt at Bodmin, and at Altarnon Vicarage very strongly. The Rev. A. H. Malan writes, that "An earthquake vibration of remarkable sharpness was felt in N. Cornwall, on October 7th, at 2 p.m.

Some idea of the distinct nature of the shock in this district (Altarnon) may be gathered from the fact that at the time of its occurrence we were burning, as fast as flames could consume them, an accumulated pile of circulars, catalogues, etc., in an attic grate on the west side of the house. A furious gale—force 8—10—happened to be blowing from the west, so that the roaring of the flames in the chimney mingled with the roaring of the wind among some silver firs standing to the west of the house, and designed to break the violence of these periodical storms: and yet, above both roarings, a sound, or sensation, or disturbance under foot—it is difficult to say which—was experienced, lasting while one might slowly count 5 or 6, and resembling a load of coal being suddenly shot out of a cart into a cellar. We were at a loss to account for the phenomenon: guns at Plymouth; chimney on fire; a heavily

laden wagon being driven at express speed down round a sharp curve immediately behind the house—for the sound seemed close to the surface—were all suggested as possible explanations, but independent evidence confirmed the real cause. It is noteworthy that the servants downstairs did not observe or hear any rattling of the kitchen crockery. A boy at Camelford, being asked what the sound was like, said “why it went gr-r-r-r—bang!” but it must be admitted his description is rather too vivid and picturesque for that dry-as-dust accuracy which scientific reports demand.”

Many houses at Callington were perceptibly shaken. In Camelford the vibration of the ground was felt by several persons, and small articles shook and in some cases were thrown down, whilst at Boscastle, it is stated, two distinct shocks occurred.

No. 2.

Rock Markings on the River Gannel.

Can any one suggest the age of the circular cuttings made in the rocks on the shore of the Gannel, between Newquay and Crantock; and their probable purpose?

The theories so far advanced have been, that they are marks of Phœnician visitors, or else of smugglers, or of prisoners condemned to hard labour, or of agriculturalists, needing stone caps for rick rests. It has been thought they might be a sign of a dangerous place.

Are any like them found elsewhere?

W. IAGO.

No. 3.

Arms carved on Bodrugan House.

The Vicar of St. Goran has forwarded sketch of an armorial shield, sculptured over the entrance door of Bodrugan Barton house, visited by the R.I. of C. Excursion, last autumn, and asks:—whose arms are here displayed?

REPLY:—“The sketch shows “a chevron between three water bougets, impaling three bendlets, over all on a chief quarterly, 1 and

4 a hand, 2 and 3 an inverted heart." (The hand in the first quarter appears open and erect, that in the fourth quarter open and inverted.)

This shield seems to belong to the last of "the Bodrugin's proper," viz: Joanna the daughter and heiress of Sir Otho, and to her husband, the Judge Hill. She was the great-grandmother of the leap-taker.

The dexter coat is doubtless that of Hill, or Hulle (argent a chevron between 3 water bougets sable), the impaled coat being that of Bodrugin (Argent 3 bendlets gules).

We find that Sir John Hill, or Hulle, of Hunston, had as on and heir, Sir Robert, of Spraxton, a judge of the Common Pleas. C. S. Gilbert (Vol. 2, p. 149), writes of him:—

*"A better man, or man more just,
There never was in any trust."*

Joanna, heiress of the Bodrugans, born about 1359, took him for her fourth husband. She was married to (1) Sir John Trevaygon, (2) Ralph Trenowth, (3) Sir John Trevarthian, (4) Sir Robert Hill, or Hulle; he died in 1424, she a few years later.

On her becoming married the name of Bodrugin, or Bodrigan, would have died out, had not her son, Otho Trenowth, assumed the name as well as the succession to estates of Bodrugin. It was his grandson, Sir Richard [Trenowth] de Bodrigan, who took the celebrated sea-ward leap, when pursued, after the defeat of Bosworth Field. The sculptured Shield of Arms sketched by the Rev. C. R. Sowell is noteworthy, because it gives, with the arms of Judge Hill and his lady, a chief not hitherto noticed. Various arms of Hill, or Hull, are given in the works of C. S. Gilbert, Lysons, Burke, Col. Vivian, &c., but they do not mention the chief and its charges. Pedigrees of Hill and Bodrigan appear in Vivian and Maclean (Vol. 1, pp. 548-555), but there are discrepancies as to the arms assigned to Sir Robert Hill's family. See C. S. Gilbert (Vol. 2, p. 149, Vol. 3, Plate xv), arms of Hill, of Carwythenack (argent a chevron between 3 water bougets sable) quarterly with Hill, of Trenethick, (sable a fesse between 2 chevrons argent), and Vivian (Visitations, p. 227), &c.

W. IAGO.

No. 4.

Wadebridge.

QUERY :—We have been asked,—Is there any likelihood that Leland related what really had been done, when he mentioned that one told him that “the fundation of certain of th’ arches was first sette on so quick-sandy ground that Lovebone [that is Lovebond, the Vicar of Egloshayle] almost despairid to performe the bridg ontyl such tyme as he layed *pakkes of wools* for fundation.”?

REPLY :—Some light may be thrown on this legend by comparing it with similar traditions prevalent elsewhere. London bridge, for instance, has its wool-pack story.

Fearnside & Harral, in their “History of London” (illustrated by Wood), tell us (at page 64) that the ancient wooden bridge across the Thames was replaced by the stone structure known as Old London Bridge, which was commenced in 1176, rather to the west of the former site. The king, clergy, and laity subscribed funds, and “a tax was imposed on wool towards defraying the expenses, *which occasioned the vulgar belief that London Bridge was built on wool packs.*”

Peter, minister of St. Mary Cole church, was the architect. He did not live to complete it. A letter in the tower of London (written in the reign of King John) recommends the learned and worthy clerk Isambert as a proper person to finish it.

By a curious coincidence the ancient cleric Peter, of St. Mary Cole Abbey church, has been of late years succeeded in his office by the son of a successor of Lovebond, the Vicar of Egloshayle, Peter and Lovebond both being connected with the wool-pack-bridge legends.

W. IAGO.

No. 5.

Lewanick Church.

The lamentable fire at Lewanick church—so complete in its intensity of destruction, that not a morsel of charcoal from the oak benches, waggon-roof, or other woodwork remained—has served to establish—contrary to all previous supposition—the superiority of granite, as a heat resisting material, over Polyphant-

stone. In this church the N. Arcade is granite, the S. polyphant ; and while the former only shews a few cracks here and there in the moulding of one or two of the pillars, and is so comparatively uninjured, that nearly the whole arcade will remain as before, the latter must be wholly renewed. Indeed the greater portion of each polyphant pillar and arch is so eaten away, that all moulding has vanished, and only the central core of each pillar—like the heart of old oak posts, whose outside layers have perished—remains good. It is suggested that the heat resisting properties of polyphant-stone depend largely upon the blocks being laid with their strata horizontal, while in this case they were laid perpendicularly : into which, not being a petrologist, I am unqualified to enter.

It is observable that the joists of the 15th century floors were laid on carefully-built dwarf walls, with ample air-spaces between the walls and beneath the floors : a very proper method of laying flooring—rather more rare than desirable, however, in churches of this period.

No. 6.

Pillared Piscina.

What examples of these ancient drains are there in Cornwall, beside the following ?—Blight figures one at Bodmin ; and there are sketches of others at Altarnon church, (? brought from St. Luke's chapel, near Palmer's Bridge) ; and at Egloskerry ; with the latter of which may be compared one at the Mumbles. These shafted Piscinae are considered uncommon : it would be interesting to know what other examples Cornwall possesses.

No. 7.

Norman Tympana.

At Egloskerry, also, there are the tympanum, arch, and jambs of a Norman door in the north wall of nave. The dragon—the emblem of evil—being displayed on the outside of a church against the north door is supposed to be symbolic of evil spirits and all evil passing out through the north door, while good spirits and all good enter by the south door : the latter is therefore often embellished with the *Agnus Dei*.

A. H. MALAN.

No. 8.

Tolcarn Cross.

Mr. Thomas Clark writes :—" on the 20th of February, I re-visited the site of this cross, in company with the Rev. R. F. Fraser-Frizell, rector of S. Allen. It was a plain cross of Pentewan stone,—shaft, arms, and head. The shaft, as I have before stated, served for many years as a gate post, and afterwards was cut in two to make door sills for piggeries, but we found the said doorways so deeply imbedded in manure as to prevent our approaching them. The arms of this cross were some years ago used as quoins in building a house at Tolcarn, but this house has been burnt down since my last visit, and all trace of them is lost. Two of the corner stones of the base were used in a building at Trefronick, near Tolcarn, but a part of the wall has been taken down, and one of the stones removed no one knows whither, but the other we found in the N.E. corner of the dwelling house, in a good state of preservation, about 3 feet from the ground. Another part of the base is serving as a doorstep to the mill at Lanner. At Trefronick is a granite cross serving as a step at the back entrance, but which the farmer and landowner have given to the Rev. R. F. Fraser-Frizell to place in S. Allen Churchyard. In a meadow at Trevalso, near Trerice-water, S. Allen, a granite cross is being used as a gate-post, and this, too, Mr. Fraser-Frizell will endeavour to obtain. The neighbourhood seems to be rich in relics of the past, and the Rector offers a cordial invitation to the members of the Institution to visit the various places of interest."

Royal Institution of Cornwall.

—◆—
SPRING MEETING, MAY 22nd, 1890.
—◆—

ADDRESS BY THE PRESIDENT,

EDWIN DUNKIN, F.R.S.

PAST-PRESIDENT OF THE ROYAL ASTRONOMICAL SOCIETY.

Ladies and Gentlemen,—When in my early youth, in the year 1832, I left Truro for London, I could hardly have anticipated that, more than half a century afterwards, I should have the honour of occupying the chair of this old established scientific institution, of which I have the most pleasing remembrances, since the time when I passed its walls daily on my way to and from school. I cannot, therefore, refrain from expressing my thanks to you all for the great compliment you have paid me, particularly when I consider that my connection with science has been exclusively devoted to an abstruse branch of astronomy, which has not usually been one of the subjects discussed at the ordinary meetings of this Institution. However, I can assure you that it is indeed a great pleasure to me to be here as your President, and my only regret is that, owing to my residence in London, and other unavoidable circumstances, I shall not be able to be with you so frequently as I should wish.

I find that at the Spring Meeting the President has generally the melancholy duty of paying a passing tribute to those of our members whose loss to the Institution we have to deplore through death. Although the number of members who have died during the past year is not numerous, they are those who have been for many years connected with the Institution, and who have ever been ready to assist it.*

*My best thanks are due to my friend Major Parkyn, F.G.S., for his kind assistance in this portion of my address.

The noble house of Boscawen, whose influence was formerly so powerful in connection with the parliamentary and municipal history of Truro, has lost its late representative, Viscount Falmouth, who had been a member since his succession to the title in 1852. The lords of Tregothnan have always been steady supporters of the Institution, being numbered amongst the very earliest subscribers, and they have in many ways befriended it from the date of its foundation in 1818, as shown by their gifts in our Museum, as well as by their direct interest in its scientific progress. It is pleasing to find that the present possessor of the title has already shown his appreciation of the objects of the Institution by his interest and support.

By the death of Mr. Henry Spry Leverton, M.R.C.S., we have lost one who was intimately acquainted with the business of the Institution. He always took a deep and practical interest in all those matters which tended to increase its scientific usefulness; and himself possessing considerable attainments, he was a most valued friend and adviser. He was for many years a member of the Council, where his constant attendance, his genial kind-hearted manner, his pleasing diffidence, and his sound advice, were highly prized. His unassuming ways won their way to all hearts.

The Rev. William Rogers, rector of Mawnan since 1842, was much esteemed by his parishioners for the genial simplicity of his character. He was also long connected with our Institution, and a frequent attendant at our meetings. He, from time to time, sent valuable objects to enrich our Museum, and was a contributor to the Journal. He attained a considerable reputation as a conchologist, and in his time made a collection of shells, many of which are unique, and others peculiarly valuable to us, as they were collected around our coast. His son, Mr. Ralph Baron Rogers, has kindly presented this collection to the Institution, full particulars of which will be given in the annual report of the Council in November next. Mr. Rogers was a member of most of the local scientific societies, and only recently he gave a very interesting address at the Falmouth Natural History Society, of which he was the President.

Our honorary member, Mr. O. Spence Bate, F.R.S., of Plymouth, a naturalist of considerable reputation, a writer on the prehistoric antiquities of Cornwall and Devon, and a contributor to our Journal, has also passed away. As a naturalist, his favourite study was the *Crustacea*; and in the development and morphology of this group he did most of the work by which his name will long be remembered by students of natural science. His memoirs in the Proceedings and Transactions of the Royal Society are well remembered, as exhibiting in a marked manner the interest which he took in elucidating the remarkable transformations undergone by the young of *Crustacea*, showing his thorough familiarity with the subject. In his later years, Mr. Bate prepared the voluminous report on the *Crustacea Macrura*, dredged during the expedition of H.M.S. *Challenger*, a most valuable work occupying two large volumes of the Official Report, and illustrated by 150 lithographic plates, most of which were drawn by his own hand. Mr. Bate was a native of Truro, where he received his education at the Grammar School, 1829-37.

The progress of the Institution on which Mr. John Tremayne, our late President, congratulated the members in his address at the last Spring Meeting, has not only been fully maintained, but has surpassed that of any recent year. This progress has been marked by a large increase of members, and also by valuable additions to the Museum and Library. The gifts to the Museum include further handsome donations from Mrs. Sharp, of London; Mr. Walter H. Harris, Sheriff of London; Mr. R. B. Rogers, of Mawnan; besides many presents from other members and friends, the details of which will appear in our Journal. The Library has been enriched by donations of numerous volumes of books by Mr. John D. Enys, an old and esteemed member, long resident in New Zealand; by Mrs. Sharp, of London; and by other friends of the Institution.

The interest in the museum is still sustained, and the great increase in the number of visitors is a subject of much congratulation. A very pleasing feature connected with it is the appreciative interest shown by them in the various subjects which the Museum illustrates. The first step towards the proper arrangement of the collections in the Museum has been taken in

the display of the Cornish minerals. The numerous visitors interested in the mineralogy of the county, will now have the opportunity of seeing a representative collection of the mineralogical wealth of Cornwall displayed in one case. This is the realization of a long-felt want, and of an often expressed wish.

As President of the Institution, I have much pleasure in referring to the valuable labours of its curator, Mr. Henry Crowther, which are so manifest in the altered and improved state of the Museum. The work of renovation and classification, now engrossing his attention, is from its very nature necessarily slow, but when once accomplished, it will be of the utmost utility and benefit. It is pleasing to know that Mr. Crowther's services, during the past winter, have been secured by the Mining School at Camborne, where he has weekly held classes in mineralogy and geology. His scientific attainments are also of the greatest service to visitors to the Museum, by the intelligent information afforded them, and by the knowledge imparted by him to the young scholars now so frequently found in the rooms of the Museum.

The Council of the Institution are always much gratified to learn of the success of those who, at any time, have been connected with us, and it is with much satisfaction that reference is made to-day to Mr. Richard Pearce, H.B.M. Vice-Consul at Denver, Colorado, U.S. Mr. Pearce has attained to considerable eminence in his new home, and is regarded as one of the leading lights in science in America. Several important discoveries have been made by him in metallurgy, and we are pleased to learn that he looks back with the greatest pleasure to his former connection with our Institution, to which he ever feels a debt of deep gratitude, as shown by the numerous presents forwarded by him to the Museum. Only recently, Mr. Pearce has liberally presented the excellent case specially made for the display of the Cornish minerals.

The indefatigable energy of the Rev. William Iago, a past-President of the Institution, has enabled him to decipher, after many fruitless efforts, the inscription on the Miliary stone found by him at Tintagel, affording as it probably does the best real evidence of the occupation of Cornwall by the Romans.

This ancient inscribed stone had been evidently, for a long period, doing duty as the lich-stone upon the central block of masonry used for the support of coffins at the eastern entrance of the churchyard. Undoubtedly, it is the greatest archæological discovery of recent years in Cornwall.

The Institution still continues to be indebted to the press of the two western counties for the excellent and full reports of its meetings, and for occasional notices of its progress.

The responsibility laid upon the Council by the bequest of our former President, Mr. W. Jory Henwood, F.R.S., is an important one, requiring great care and attention, in order that the triennial awards of the medal may be really reflective of the value of the researches considered worthy of acknowledgment. It appears to me that the general custom of awarding medals by our principal scientific societies, has afforded a graceful means of recognising the merits of original research, when carried on from a pure desire for the advancement of science. It is my sincere conviction, after having frequently taken part in making such awards, that not only the recipient of the medal has been honoured, but that also, in most cases, the reputation of the Society has been raised in the estimation of the general scientific world, both at home and abroad. In our own case, the success, or otherwise, of this new departure will depend chiefly on the authors themselves, who should never forget that the main object of the medal is to encourage the study of local science, as well as to create the personal distinction of Henwood medallist. I am glad to learn that the prospect of an early award has awakened a great interest amongst the *literati* of the county, and those interested in the question, the effects of which are seen in the production of a series of papers relating to Cornwall, which, probably, has never been excelled.

Volume ix of the Journal was completed during last year by the issue of Part iv. The members may be congratulated on the many interesting papers contained in the volume on various subjects, but more particularly on the mediæval history, antiquities, geology, and ancient topography of the county. Some of the communications show evidence of being the results of much patient research, and they throw considerable light on various

obscure questions connected with Cornish history and topography. Part I of a new volume will soon be in the hands of the members. It is the largest and most important number of the Journal ever published, containing more than three hundred pages.

Mr. W. P. Courtney's "Parliamentary Representation of Cornwall to 1832," a copy of which he kindly forwarded to this Institution, is a very valuable contribution to Cornish literature, and probably the most important book on Cornwall published during the year.

Very valuable material has been made available to the student of ecclesiastical history, by the recent publication of the two closely-printed volumes, containing abstracts of the ancient registers of the diocese of Exeter, ably edited by the Rev. Prebendary F. C. Hingeston-Randolph. These registers commence in the year 1257, with the Acts of Bishop Bronescombe, and they are continued in a nearly unbroken series to the present time. The two volumes already issued comprise an index, or rather an abstract, of the registers of Bishops Bronescombe, Quivil, and Stafford, and they are full of details illustrating the manners and habits of the period to which they refer. Probably, there is not a parish in Cornwall which is not referred to with more or less fulness. Mr. Hingeston-Randolph has nearly completed a third volume, containing an abstract of the register of Bishop de Stapeldon, and he certainly deserves the hearty support of all who are interested in historical research.

As a Cornishman, it has given me much pleasure to hear that our member, Mr. G. O. Boase, has nearly completed his laborious compilation of Cornish notes, entitled "Collectanea Cornubiensia," the whole of the text, and a large part of the index, filling about 900 pages, being in type. It is anticipated that the work will be out of the printer's hands soon after the close of the present year. I have been informed that no existing work on Cornwall contains so much personal information as will be found in its pages. The index, which contains much additional matter, not included in the text, will be one of the longest list of persons and places connected with the county ever given. Besides the numerous biographical and topographical notes, the

work will contain "The Journal of the Mayor of Penzance," 1816-17, a very interesting municipal document, hitherto quite unknown to the public. I am sure that you will join with me in congratulating Mr. Boase on the prospect of an early completion of this comprehensive and valuable contribution to Cornish books of reference.

I am not aware whether attention has ever been directed to an important error in the longitudes of the principal stations of the Ordnance Survey, given in most of the parochial and descriptive works on Cornwall, even in those of recent date, and taken originally from a preliminary report on the Survey published in the "Philosophical Transactions" for 1800. This error was first pointed out by Dr. Tiarks, who in 1822 determined the longitude of Funchal, by means of fifteen chronometers conveyed to and from the island of Madeira, making Pendennis Castle one of the intermediate stations. By this operation, the new determination of longitude placed Pendennis Castle considerably to the westward of that assigned to it by the Ordnance Survey. In the following year, Dr. Tiarks repeated the operation by the transmission of twenty-six chronometers between Dover, Portsmouth, and Falmouth, the results of which fully confirmed his previous observations, showing an error of more than four seconds in time in the longitude of Pendennis Castle and other Cornish stations, as given in the preliminary report.*

The Director-General of the Ordnance Survey has recently informed me, that the longitudes originally given in the table in the "Philosophical Transactions" are largely in error, owing to the neglect of the application of a correction depending on

* Davies Gilbert states in his "Parochial History, Vol. II, p. 23, that "the longitude of Falmouth has been ascertained by Dr. Tiarks with the greatest care (see *Phil. Trans.* for 1824) : the flag-staff at Pendennis Castle, 20m. 11.5s west." —The longitude printed in the preliminary report of the Ordnance Survey is 20m. 6.9s west, or more than four seconds of time too small.

The Ordnance Survey authorities at Southampton have lately, at my request, accurately determined the geographical position of the Falmouth Observatory, using the best modern data, to be as follows :—

North Latitude	...	50° 8' 59.0"
West Longitude	...	5° 4' 34.5"
West Longitude in time	...	20m. 18.3s

(Report, R.C.P.S., 1888, pp. 106-110).

the variation in the length of a degree perpendicular to the meridian. The longitudes are all in defect about $\frac{1}{160}$ part of the distance of the station east or west of Greenwich, and are therefore, for scientific purposes, practically obsolete. Taking one illustration of the effect of this error, I find it stated in Vol. I, p. 15, of Davies Gilbert's "Parochial History of Cornwall," that "St. Agnes Beacon was chosen as one of the principal western stations in the great Trigonometrical Survey of England. The position of the summit was then determined with great accuracy: latitude, $50^{\circ} 18' 27''$; longitude, $5^{\circ} 11' 55.7''$. In time, 20m. 47.7s." When this erroneous longitude of St. Agnes Beacon is corrected, by adding $\frac{1}{160}$ part, it becomes $5^{\circ} 12' 58.1''$ or in time, 20m. 51.9s, as it is now correctly given in the more recent editions of the Ordnance maps. The true geographical position of this important station is therefore about 4,050 feet farther west of Greenwich than that assigned to it in all the Cornish historical or descriptive works that I have seen. The same remark applies, more or less, to all the longitudes of the other stations of the Ordnance Survey in Cornwall, taken from the erroneous table published in 1800.

While preparing these notes, I have been encouraged to deviate, in some measure, from the strictly local character of most of the addresses of my predecessors, by the important remark of a past-President of the Institution, that "astronomy, perhaps, has not hitherto received from us the attention it deserves."* I have, therefore, taken for granted that you are expecting from me some account of recent researches connected with that popular science, of which I have been an active student since I joined the staff at the Royal Observatory in 1838. I do not, however, intend to read to you a long sensational essay on the romance of astronomy, for I presume you are already familiar with many of the wonders of the starry heavens; as I prefer to occupy your attention by saying a few words on a far more difficult subject, and one probably new to many now present, relating to the physical constitution of the heavenly bodies, as determined from recent researches on the analysis of the light emitted from their gaseous photospheres. I shall also briefly describe to you a few of the marvellous photographic delinea-

* Journal, R.I.C. Vol. ix, p. 383.

tions of the invisible sky ; of stars that have never been seen directly by the human eye, owing to their light being too feeble to make an impression on the delicate organism of the retina, even when assisted by the most powerful telescope in existence; and, what is more remarkable, of dark stars—stars which have apparently died out, and whose presence can only be inferred by their influence on the light and motion of their brilliant companions.

Astronomy has been, from the earliest period, one of the most fascinating of the physical sciences, and when studied with the object of obtaining a scientific acquaintance with the peculiar features and movements of the heavenly bodies, the countless luminaries of all shades of brilliancy, apparently daily revolving round the earth, form ample materials for pleasure and study. Astronomy may in truth be correctly termed the “sublime science,” when we behold the grandeur and illimitable harmony prevailing in the mysterious movements of the members of the stellar universe, constituting one of the most imposing spectacles that nature offers to our observation.

The romance of astronomy is always attractive to early students of the stars, whether they be old or young. I have often been complimented by them on the sublimity of my profession ; for I have been told,—what can be more serene and beautiful to a contemplative mind, than the pleasure of constantly spending the evening hours in observing the placid beauty of the moon, the soft radiance of the planets with their attendant satellites, and the glittering splendour of the evening star. Alas ! how contrary all this imaginative science is to the true nightly occupation of the astronomer. I fear that at such times his mind is generally far too much engrossed in noting the exact time of passage of the various objects over a series of fine lines of spider's web, stretched across the field of view ; in the readings of his circles and micrometers ; or in the necessary manipulation of his telescope, to have much opportunity or desire for sentimental reflections. In fact, most official astronomers who have passed a fair portion of their lives sitting or lying, night after night, on an observing chair on a frosty night, either in the open air, or in a room with the roof thrown

partially aside, can hardly realize the popular feelings associated with this science in the minds of enthusiastic beginners.*

The progress of astronomical science during the last fifty years has been so great, that I have had some hesitation in deciding what branch I should select as the principal theme of my address. If I had chosen what may be termed the mathematical section of astronomy, or the theories of the movements of the various members of the solar system, I should have been able to have shown you how, by the nightly labours of the faithful planet-watchers at Greenwich, the peculiar motions of the sun, moon, and planets, from Mercury to Neptune, and the effects of their mutual attraction on each other, have been determined with an accuracy that leaves but little room for any further improvement in their calculated orbits. For it must be claimed for our National Observatory, that its reputation is second to none among the observatories of the world, and that every standard lunar or planetary theory investigated by English or foreign mathematicians, has been based on the meridian observations of the sun, moon, and planets made at the Royal Observatory, Greenwich. I could also have given you some slight idea of the daily work carried on within the walls of an astronomical observatory, which even to this day is a source of mystery to many. But, as I have said, I would rather speak of a comparatively new branch of astronomy which, although its details may appear somewhat technical to a general assembly, is deserving of the greatest consideration by all who are interested in the progress of knowledge. This branch of the physics of astronomy is now permanently added to the daily routine work of the Royal Observatory, side by side with the old-established

* The following extract is taken from a paper read at a recent meeting of the Royal Astronomical Society. It gives a good illustration of the kind of night-exposure to which astronomers are sometimes liable. Mr. Boeddicker, astronomer at the Earl of Rosse's observatory, who has been engaged more than five years on an elaborate drawing of the Milky Way, states :—As much as possible I drew the different sections only when they were near the meridian, in order to obtain the conditions most favourable for atmospheric transparency. This involved for the greater part of the Milky Way the necessity of my lying flat on my back (or nearly so) in the open air for hours together—a position which, especially on frosty nights, proved somewhat trying, for no amount of clothing was found sufficient to counteract the radiation of heat from the body.

systems of meridian observations of the stars and planets, which have already supplied sufficient materials from which the future, as well as the past history of the heavens has been written, thus fulfilling the objects of the foundation of the Observatory, as expressed in the original warrant of Flamsteed, the first Astronomer Royal, "to apply himself with the most exact care and diligence in the rectifying the tables of the motions of the heavens and the places of the fixed stars, in order to find out the so much desired longitude at sea, for the perfecting the art of navigation."

I must now claim your attention for a few minutes while I explain, very briefly, a few of the principal deductions derived from recent researches in spectrum analysis, by which the astronomer has been assisted in building up, step by step, what is now believed to be the most probable theory of the physical constitution of the sun, the fixed stars, nebulae, and meteorites. For it has been undoubtedly proved from these researches, that several metals and gases, either in a solid, liquid, or vapour form, are common to the sun and earth. We know with absolute certainty that the sun contains similar elements to those existing in the earth, with this distinction, that in the photosphere of the sun, iron, copper, and other metals are found in a gaseous form, and not as here in a cold and solid state. The great body of the sun is therefore composed of intensely hot gases, corresponding to different metals; outside these there are clouds consisting not of the vapour of water as on the earth, but of the vapours of different gases. What is more remarkable, similar terrestrial substances as in the sun also form, in a greater or less degree, the principal material elements of most of the fixed stars whose light has been spectroscopically examined, even of those situated in the remotest parts of space. This unity of operation appears to be existent throughout the universe, so far as light enables us to have cognizance of distant objects.

It is not my intention to enter into a detailed scientific description of the theories or methods of observation employed in spectrum analysis, further than to state, that all our knowledge of the peculiar constitution of the heavenly bodies is based on the existence of certain dark or bright bands or lines which are

observed to cross the spectrum of solar and stellar light ; and, in like manner, across the spectra of the heated vapours of terrestrial metals and gases, the spectrum of each star, metal, or gas, having its own peculiar system of lines, the relative positions of which in each spectrum are invariable. By examining the corresponding position of these dark or bright lines in different spectra, it is possible to name many of the substances existing as gas in the sun and stars. You are doubtless all aware that when a beam, or point, of solar light is made to pass through an ordinary prism, it is resolved, or decomposed, into a number of divergent rays of different colours and refrangibilities, which if projected on a screen, forms not a beam of white light as before entering the prism, but a luminous band exhibiting the seven well-known prismatic colours, passing from red, or the ray least refracted or bent, through yellow, green, blue, violet, indigo, and lavender. The red end of the spectrum contains the heat rays, and the lavender end the actinic and chemical rays, thus accounting for the three-fold action of the sunbeam, its heating, lighting, and chemical powers.

Dr. Wollaston, in 1802, was the first observer of some of the principal dark lines in the solar spectrum. He did not, however, consider that his discovery was of much scientific importance, except that he formed an opinion that they were caused by actual and generic lines of separation between the distinctive colours of the spectrum. Thirteen years afterwards, Fraunhofer, a distinguished German physicist, while viewing a distinct and narrow line of sunlight, by placing a prism of great purity before the object-glass of a small telescope, observed and accurately measured the relative positions of a large number of dark lines which had escaped Dr. Wollaston. More recent physical astronomers have mapped out the lines in the solar spectrum with still greater completeness, and have micro-metrically measured, with extreme accuracy, the relative positions of thousands of lines. The position of each line in the spectrum is usually expressed by a number measured on a scale of wavelengths, affording an easy method for referring the dark or bright lines in the spectra of the stars and metals, to the corresponding lines in the solar spectrum.

It is to the astro-chemical researches of M. M. Kirchhoff and Bunsen that we owe the discovery of the coincidence of the bright lines in the spectra of terrestrial substances with corresponding dark lines in the solar spectrum. In 1859, soon after Kirchhoff discovered that the bright intermittent lines in the metallic spectra were converted into dark lines, by viewing them through less intensely heated vapours of the same metals, he had a very powerful spectroscope constructed, so arranged as to enable him to observe the solar and metallic spectra simultaneously. While examining the two classes of spectra with this instrument, he saw, to his astonishment, that the positions of many of the dark solar lines were exhibited in coincidence with those of the bright metallic lines. In this manner, he was able to demonstrate conclusively that the bright lines of the vapours of magnesium, copper, iron, and of several other terrestrial substances, were represented by certain dark absorption lines visible in the solar spectrum, so far as could be distinguished by their respective wave-lengths. For, if any metal or gas is heated to a state of incandescence, or, in other words, made white-hot, and the rays of light emitted from it are allowed to pass through less heated vapours of the same metal or gas, a large portion of the light is absorbed while passing through these vapours, and the lines which would have appeared bright, had there been no interference, become dark. On one occasion, while comparing the spectrum of iron with that of the sun, Kirchhoff unexpectedly perceived that dark solar lines occurred in positions coincident with those of all the bright iron lines. Not only had each iron line its dark representative in the solar spectrum, but the breadth and intensity of the two sets of lines also agreed with each other, the brightest iron lines corresponding to the darkest solar lines. Thus for each of more than four hundred iron lines, a dark solar line was seen to correspond. An idea at once flashed across the mind of this distinguished philosopher, that to produce so perfect a coincidence, vapours of iron must be contained in the solar photosphere. From this discovery of Kirchhoff have sprung the long series of investigations which, in the hands of more recent physical-astronomers, has produced results of the most wonderful character, thus enlarging our knowledge of the cosmical origin of the universe to an extent, of which the first

discoverer of the dark lines in 1802 could have had no conception. Few can realize how important, in a scientific point of view, these investigations have become; for it is solely from these simple coincidences of lines in different classes of spectra, that all the inferences and theories that have emanated from the philosopher's brain, in relation to this subject, have been derived.

What is a star? The answer that I may briefly give to this question must be, in some measure, of a speculative nature. In all probability, most of the fixed stars visible to the naked eye, and also others that are strictly telescopic, are incandescent bodies shining by their own intrinsic light, each forming possibly the central sun of a planetary system. But you may naturally ask me on what theory such a romantic proposition can be sustained. My answer would be that observation has shown, with great certainty, that several of the visibly double and triple stars are stellar systems, proved to be in physical harmony by the revolution of the separate members of the group round one common centre of gravity; and this connection is so well established that the elements of their orbits are accurately calculated for a large number of these binary and ternary stars. But, as I have before said, it is very remarkable that in all the twinkling stars of different magnitudes, whose spectra have been examined, sufficient evidence has been gathered to show that the substances of which they are composed bear a strong affinity to the constitution of some of the existing organisms of our own earth, including iron, sodium, hydrogen, magnesium, and other substances. It has been stated by Dr. W. Huggins, F.R.S., and Prof. W. C. Miller, F.R.S., in a joint communication to the Royal Society, that "these forms of elementary matter, when influenced by heat, light, and chemical force, all of which we have certain knowledge are radiated from the stars, afford some of the most important conditions which are known to be indispensable to the existence of living organisms such as those with which we are acquainted." It may be concluded, therefore, as a very probable consequence, "that at least the brighter stars are, like our sun, upholding and energizing centres of systems of worlds adapted to be the abodes of living beings."

All the early spectroscopic observations were made by direct vision, the spectroscope having been fitted with prisms of a high dispersive power, and attached to a telescope in the place of the ordinary eye-piece. When astronomical photography was first introduced in these experiments, great difficulty was found, by most observers, in obtaining a good image of the spectrum on the photographic plate, owing to the care required in controlling the clock, so that a sensibly uniform motion of the telescope may be preserved while following the star.* Dr. Huggins, however, in 1876, had so far successfully arranged the control of the driving clock of his telescope, that he was able to obtain a satisfactory photograph of the spectrum of the bright star Vega, and also of a few of the other principal stars. The solar spectrum, in each case, was taken on the same plate, so that a direct comparison could be made, in order to identify the separate stellar lines with the corresponding solar lines. Two dark lines crossing the spectrum of Vega were thus easily recognised to be coincident with the position of the two solar lines of hydrogen. Five other lines were also detected in the spectrum. These early photographs were examined with great interest at the meetings of the Royal Society, but more recently, owing to the adoption of improved methods of observation, the number of lines recorded in most of the photographs are greatly increased. Sometimes they exceed a hundred.

The mapping of the lines in the photographic spectra of the stars is a research of great delicacy, as it is necessary, for a proper comparison of the lines, that their definition in so small a spectrum should be as perfect as possible. The photographic plates in these early experiments were only $1\frac{1}{4}$ -inch long by $\frac{1}{4}$ -inch wide. This requisite precision in the adjustments arises partly on account of the small quantity of light at the disposal of the

* The labour involved in work of this delicate nature is very great, as it is necessary to keep a constant watch on the star's image when projected upon the slit of the spectroscope, in order to correct by hand any small inequalities of the motion of the telescope, which might throw the star off the slit. When it is considered that this slit may be only $\frac{1}{320}$ th of an inch in width, and that the star's image must remain steadily upon it for perhaps an hour or more, it is not difficult to perceive how necessary it is to have the power of continuous supervision, and of instant control by hand, in order to give sufficient time to record the character of the spectrum upon a gelatine plate of extreme sensitiveness.

observer, and partly to the extreme care necessary while making the comparison of the two spectra, in order to ascertain with exactness whether the presence or absence of the vapour of any particular terrestrial substance is indicated by corresponding coincidences of lines in the two spectra. A careful examination of a large number of photographs has almost conclusively shown that the larger stars may be arranged in a connected series, the various types passing from the class of white stars, through those resembling the nature of our sun, to the stars which shine with an orange or red light. It has been suggested by Dr. Huggins that these different types of spectra may probably indicate the relative ages of the stars, or, at least, their relative temperatures.

Padre Secchi, the distinguished Italian astronomer, has discussed a large number of his own eye observations, classifying the stellar spectra into three types:—1. The white or bluish stars, like Sirius and Vega; 2. Red or orange-tinted stars, as Betelgeuse and Antares; 3. Spectra of the type of the sun, such as Capella and Arcturus. The spectrum of each of these several types is crossed by numerous fine lines, and direct measurement has shown that they mostly correspond with distinctive lines in the solar spectrum.

A few of the stars have been observed to give bright instead of dark lines, from which it may be inferred that a large portion of their light is emitted from glowing gas, chiefly hydrogen. This is the case in most of the temporary stars which have appeared suddenly from time to time. In May, 1866, and again in November, 1876, two of these remarkable outbursts took place, the first in Corona Borealis, and the second in Cygnus, each being equal to a star of the second or third magnitude, though a few days previously to their discovery, they were invisible to the naked eye. Their spectrum of bright lines of hydrogen revealed them to us as worlds in a state of gaseous incandescence, produced probably by large quantities of gas evolved from them during some vast internal convulsion, of which we became cognizant only after the lapse of hundreds of years. May we not reasonably conclude that, at a distant age, these and similar stellar outbursts were literally stars on fire!

Observations of stellar spectra are now carried on systematically in several observatories in Europe and the United States, especially at the Harvard Observatory, Cambridge, U.S., where distinct researches are in progress with the object of making a perfect catalogue of photographed spectra of all stars visible to the naked eye. This catalogue is intended to be supplemented by more elaborate photographs of the spectra of bright stars, and also of some of the fainter stars. This great scientific research is very near the point of completion. A few years ago such an elaborate work would have been considered impracticable. Some very successful photographs of the spectra of a few of the brightest stars have been taken; that of Sirius, for instance, showing four hundred measurable lines. To obtain the spectra of the principal stars in the southern hemisphere on the same plan of observation, a special expedition has been sent to a station 6000 feet above the level of the sea, near Chosica, Peru, and already the spectra of about 1500 stars have been photographed, including a large number of interesting objects, of which at least nine have the hydrogen line bright in their spectra, indicating the presence of glowing gas.

Another branch of spectroscopic research of considerable scientific interest, has been introduced by Dr. Huggins, relating to the determination of the motions of stars in the line of sight, or the velocity of their approach towards, or their recession from the earth, as observed by the visible displacements of certain lines in the stellar spectra, when compared directly with corresponding lines in the spectrum of hydrogen, or of any other substance or gas. These observations have been made on the theory that "if the stars were moving towards or from the earth, their motion compounded with the earth's motion, would alter to an observer on the earth the refrangibility of the light emitted by them, and consequently the lines of terrestrial substances would no longer coincide in position in the spectrum with the dark lines produced by the absorption of the vapours of the same substances in the stars."*

Though it would not be in place for me to explain here the scientific details of the various methods of observation employed in this very important series of technical experiments, I think

* Phil. Trans., 1868, p. 529.

that I shall be in order if I state, without occupying too much of your attention, that successful observations made on this principle, have been systematically carried on for many years at the Royal Observatory, Greenwich, and at several other observatories. One of the most interesting of the results derived from them is an indication of the probable cause of the periodicity of some of the variable stars, such as Algol, the second brightest star in Perseus, and the subject is at this time creating a great interest among astronomers. It has also been recently pointed out by Prof. E. C. Pickering, that some very remarkable evidences of the periodic doubling of the line K are shown in the photographed spectra of ζ Ursæ Majoris, β Aurigæ, and a few other stars. This doubling of the line can only be satisfactorily accounted for by assuming that each of these stars, though apparently single, is really double, of which the components are nearly of equal magnitude, but too close to have been separated as yet visually, on account of their immense distance from the earth. A possible explanation of this remarkable phenomenon has been suggested, by inferring that as the two stars revolve round their common centre of gravity, separated from each other by many millions of miles, they are sometimes moving perpendicularly to the line of sight, when the lines of the combined spectrum are seen in their true positions; but when one component is approaching the earth all the lines in its spectrum will be displaced towards the blue, while in the other component receding from the earth, the lines will be displaced by an equal amount in the opposite direction, or towards the red end of the spectrum. At such times, therefore, the line, instead of appearing single, will be separated into two. In the spectrum of the star ζ Ursæ Majoris, this doubling of the line K reappears after regular intervals of fifty-two days.

As a further illustration of the interesting nature of these researches, I may mention that, by measuring the amount of displacement of the hydrogen line F in the spectrum of Sirius, Dr. Huggins found in 1868 that this, the brightest of the fixed stars, was receding from the earth in the line of sight, at the rate of 29.4 miles per second. From more recent measures, made principally at the Royal Observatory, the velocity of this

recession was observed to be decreasing gradually from year to year, till in 1882 the star was found to be approaching the earth. In the present year Sirius continues its approach, but there are distinct signs that the maximum motion in that direction has been attained, so that we may expect that a period of recession will probably return after an interval of a few years. This periodic change in the direction of the motion of Sirius may be accounted for by assuming that the star is moving in an elliptic orbit, as then the part of the star's motion, viewed in the direction of the line of sight, would naturally vary periodically as the star changes its position in its orbit. Periodic fluctuations have also been observed in the line-displacements in the spectra of several other stars. Those of Spica Virginis and Rigel seem to indicate an orbital motion, and that the systems of these two bright stars are each compounded of a brilliant and a comparatively obscure body.

The limited nature of this address will not allow me to enter more fully into this branch of my subject. To do full justice to it, much more time would be required than what I have been able to devote to spectrum analysis to-day. Besides, I wish before I sit down, to say a few words on a scheme, lately proposed, for making a complete photographic survey of the heavens, including thousands of stars invisible to the eye, even in a telescope. Since the invention of the photographic dry-plate process, such a survey has become possible, and it has been found that, by making an exposure of from three to four hours, the images of stars down to the fifteenth magnitude can be recorded on the plate. To all present appearances, many years will not elapse before this great and unique representation of the heavens will be successfully accomplished.

The scheme was first proposed to English astronomers in 1885 by Admiral Mouchez, Director of the Paris Observatory, who, in a letter addressed to me as President of the Royal Astronomical Society, advocated the formation of an international committee to take into consideration the possibility of practically carrying out this great astronomical enterprise. At a subsequent conference of astronomers of all nations, held at Paris, in April, 1887, it was resolved that the progress made in astronomical photography demands that the astronomers of the present

day should unite in undertaking a delineation of the heavens by photographic means, and that the work should be carried out at stations selected for the purpose, with instruments identical in all their essential parts. It is intended to adopt the fourteenth magnitude as the limit, and also to take a second series of photographs with a shorter exposure, to include stars only to the eleventh magnitude, and thus render possible the construction of a general star catalogue. The extent of such a catalogue may be estimated when it is understood that the total number of stars to the $11\frac{1}{2}$ magnitude is considered to be about $3\frac{1}{2}$ millions. The directors of about twenty observatories have already promised to co-operate, and the whole sky in both hemispheres has been divided into separate portions for the convenience of the different observatories. A 13-inch photographic refractor has been lately mounted at the Royal Observatory, Greenwich, specially constructed for these observations, and some trial photographs have been already taken with it. I believe the scheme will be in active operation in some places, before the close of the present year.

The feasibility of such a project has been for sometime made apparent by the beautiful stellar photographs of Paul and Prosper Henry, of the Paris Observatory, and of Mr. Isaac Roberts, F.R.S., of Liverpool. In a photograph taken by Mr. Roberts, on August 14, 1887, with an exposure of one hour, a space of about two degrees square in the Milky Way, in the constellation Cygnus, is represented. In this space there are probably about a half-dozen stars visible to the naked eye, but in the photograph no less than 16,000 are recorded, all of which you will remember are separate suns, and possibly the ruling centres of systems of worlds. At the Lick Observatory, California, Mr. Barnard has also taken some very successful photographs of a portion of the Milky Way, and of the nebula in Andromeda. For many years he had observed an inky-black hole, surrounded by nebulous matter, but in a negative of that region taken on August 1, 1889, not only is this black hole clearly shown, but the entire cloud-like formation about it, and myriads of stars, are also faithfully depicted, not one of which had ever been directly viewed by the eye of man through a telescope. I understand that the exceeding beauty of a glass

positive from this plate is beyond description. In the small portion of the sky containing the splendid nebula in Andromeda, Mr. Barnard has estimated that in the original negative (8 by 10 inches) 64,000 stars can be distinctly counted. These magnificent delineations of the invisible heavens are entirely due, as I have stated, to the adoption of the dry-plate process in photography, which admits of an exposure to the sky for a considerable length of time, without the plate becoming in the least deteriorated. In the days of the collodion wet-process, such closely studded photographs could not have been possible.

Some very beautiful photographs of nebulae, taken by Mr. A. Ainslie Common, F.R.S., of Ealing, especially of that of the celebrated nebula in Orion, are remarkable for the excellent definition of the most delicate portions, and they have excited the admiration of those who have had an opportunity of inspecting them. For these exquisite photographs, Mr. Common was awarded the gold medal of the Royal Astronomical Society. Dr. Huggins, in his spectroscopic investigation of the Orion nebula, has also employed photography with most interesting and suggestive results. The more closely that he has examined this nebula, and others of the same class, the stronger appears to be his conviction that these filmy objects are celestial systems in various stages of evolution, standing possibly in, or the beginning of, the evolutionary cycle, and consisting principally of gas of a high temperature and very tenuous. On the other hand, he considers that the stage of evolution which the great elliptic nebula in Andromeda represents, is no longer a matter of hypothesis. In a beautiful photograph of this nebula, taken by Mr. Roberts, with an exposure of four hours, a planetary system is shown at a somewhat advanced stage of evolution, and, to all appearances, several planets have been already thrown off; and the central gaseous mass has condensed to a moderate size in comparison with what it must have been before any planets had been formed.

Having now briefly noticed the advances made in our knowledge of the constitution of the stars, and of the almost infinite numbers newly revealed to us by the photographic camera, there is still another research to which I ought to allude, and which is

not only necessary to the astronomer, but is also one of great attraction to all intelligent persons, viz., the relative magnitudes of the stars. A mere tyro in astronomy cannot fail to notice the very distinctive variations of brilliancy in different quarters of the heavens, for instance, between the splendid and thickly studded constellations of Orion, Ursa Major, or Taurus, and the less favoured constellations of Hydra, Camelopardus, or Pisces. But, apart from all popular notions of the appearance of the starry heavens, it is of the highest scientific importance that the relative brightness of all the principal stars should be correctly ascertained. Until lately, the most trustworthy magnitudes have been the eye-estimations of Prof. Argelander and Dr. Heis, both of whom have made the subject a special study. Their separate scales of magnitudes sensibly agree with each other, and they have hitherto been adopted in all observatories.

The eye-estimations of magnitude are, however, likely before long to be superseded by a new series of determinations made by a process combining new principles and apparatus in the investigation. Prof. E. C. Pickering of the Harvard Observatory, has devised a photometer, by which he has carefully measured the relative intrinsic light of every star to the sixth magnitude, visible in the northern hemisphere, to the number of 4,260; while Prof. Pritchard, of the University Observatory, Oxford, by what is called a series of extinctions by a wedge photometer, has likewise measured the relative luminosity of 2,784 stars. The results of the two astronomers, although determined by photometers constructed on totally different principles, agree very closely, and they indicate that a great step has been accomplished towards a perfect knowledge of the relative lustre of the stars, from the brilliant dog-star Sirius to the faintest gem of the sixth magnitude.

And now, ladies and gentlemen, I have laid before you, in as brief a manner as possible, a few astronomical conclusions, some of which I trust will be remembered, although the subject generally may be a little technical, and one not easily mastered in a day. We have, in some measure, seen how the constitution of the boundless universe has been partially unfolded by the energy and perseverance of a small band of devoted men of

science, who have voluntarily passed most of their leisure hours in the laboratory or the observatory, striving to add something to our knowledge of the Creator's handiwork. Such eager students of scientific truth—often the most modest and retiring of men—feel themselves amply rewarded by some successful experiment or deduction similar to those delicate researches to which I have just drawn your attention. This success is not, however, ordinarily attained without many disappointments ; for at first there are sure to be many instrumental anxieties to contend with. These early difficulties are usually experienced in all kinds of original scientific research, especially when the system of observation is new, as in the case of spectrum analysis, in which the most delicate appliances of optical science, the most refined chemical analysis, and the most perfect arrangements for producing the electric spark, are conjointly essential for the prosecution of the enquiry. Frequently, although the goal appears to be almost in sight, the difficulty of reaching it seems insurmountable. But when, by skill and patience, the observer becomes more acquainted with the method of observation, these difficulties gradually disappear ; and, as he advances in his research tentatively, yet surely, he will probably soon perceive a dawn of light approaching, leading him on, step by step, to his long-looked for results, thus enabling him to exhibit some conclusive evidence of the true philosophic value of his labours.

In conclusion, I have now to thank you for the patient attention you have given to the few remarks I have made concerning the physical constitution and general distribution of the fixed stars. You will, however, perceive that I have been necessarily confined to a bare outline of only a few of the principal results deduced from the analysis of stellar light, and the photographic pictures of the heavens. But enough has been said to show that we now have some reasonable conception of what is going on in the great abyss of the firmament of stars, where, up to the present time, imagination has, for the most part, blindly wandered without a guide. We know also something of the peculiar motions that subsist amongst individual stars, especially of those associated together in a common system ; and we have absolute proof of a continuous activity prevailing

within the masses of tenuous gas composing many of the principal nebulae,—matter linked together by some powerful cause of union and common interest, and slowly generating the worlds of future ages. Although we are still only on the threshold of research into the most distant regions of the universe, few can realize the amount of positive knowledge obtained by the aid of spectrum analysis and photography, in relation to the material structure of the heavenly bodies; but like all scientific investigations of a technical character, the complete details of the subject can only be understood after a careful and systematic study of the special theories and methods of observation. I can hardly expect that many of you will have time or inclination to do this; for the present, therefore, I think we may now leave this novel section of astronomical research to the care of those who are skilled in the use of the spectroscope, and who, by their successful work, are known to be scientifically interested in the important subject of the physics of astronomy.

Royal Institution of Cornwall.

ANNUAL MEETING.

November 25th, 1890.

REPORT OF THE COUNCIL.

This Society has now well advanced into the 73rd year of its existence, and the Council in presenting their 72nd Annual Report have very great pleasure in being able to announce that the present position of the Royal Institution in Cornwall is eminently satisfactory, for if the increase of members be regarded, the large additions to the library by donations and exchanges, together with the many valuable, rare, and costly gifts to the museum, it will be found that at no previous period in the history of the society has a more encouraging state of things prevailed, or a more useful work in connection with it been carried on.

The Society has to record with regret the deaths of several of its members, many of whom have been associated with it for very lengthened periods.

Sir Warrington W. Smyth, F.R.S., of Marazion, and Kensington Gardens, London, occupied a front rank in the scientific world, as the leading authority on mineralogy and mining. He held high public offices, as chief mineral inspector for the Crown, and chairman of the Royal Commission on accidents in coal mines. Of the Geological Society of London he was successively Secretary, President, and Foreign Secretary. In Cornwall Sir Warrington was a strong supporter of its Geological Society at Penzance, and was a Vice-President of the Royal Institution at Truro, examining its museum from time to time.

Mr. Thomas Cornish was well-known throughout Cornwall for his great and varied attainments—of him it was well said, that he was a born naturalist. He was undoubtedly the greatest local authority on ichthyology, and well versed in ornithology. He was a frequent contributor to the Journal of this society, and amongst his papers published may be mentioned "The Lanisley letters"; "The fishes of West Cornwall"; "Cornish curiosities"; and "The Mackerel fishery,"—interesting contributions on these

subjects. It is also well known that he took an active interest in 1883 in the Fisheries' Exhibition, on which occasion he was invited to London to deliver a lecture on the fisheries of Cornwall. Mr. Cornish also revised portions relating to the fishes, reptiles, and amphibians of Mr. Couch's important treatise on the Cornish fauna. He was in intimate communication with this society, and it is to be regretted that a voice once so familiar within these walls will be heard no more.

Canon Phillpotts, of Porthgidden, was for a great number of years connected with the Institution, and took a personal interest in all that related to its welfare and prosperity. It was partly due to his influence that this society became possessed of its library of botanical works, many of which are rare, and all of which are valuable.

In the Rev. G. L. Church, the society has been deprived of a warm friend, and a subscriber of many years standing, as it has also been by the death of Mr. W. J. Rawlings, the well known horticulturist, a frequent attendant at its meetings, and one who often joined in the annual excursions.

Col. Fortescue, of Boconnoc, the descendant of a family so well and honourably known throughout Cornwall for their liberality, ever afforded a generous assistance to this society, and his loss is also lamented.

Another friend whom the society could ill afford to lose, was General Sir John Henry Lefroy, C.B., K.C.M.G., who so lately had sent presents to the museum.

The Council cannot close this obituary notice without referring to the death of Mr. W. Newcombe, the late curator, which has taken place since the last general meeting. His long and faithful services extended over a period approaching the third of a century. It is well-known that during the whole of this long time he truly and faithfully discharged the duties of his office, and by those more immediately connected with the local working of the society, he was regarded in the light of a personal friend.

Although death has deprived the society during the past year of so many valued members, it is gratifying to record that there has been a substantial increase of new subscribers, from some of whom valuable support may be anticipated.

The past year has shown a greater number of visitors to the museum—viz :—

Admitted free	..	..	..	3799
By ticket	..	..	..	283
By payment	..	..	..	377
				<hr/>
				4,459

Considerable progress has been made in the better placing of the objects in the museum. The new case of Cornish minerals has been arranged and labelled. This has attracted much attention from visitors. A beginning has been made in the removal of the shells from the geological into the zoological room, and at the same time the general collection of minerals is being transferred to the cases from which the shells are being taken. This when completed will show the various objects in the museum under their proper classification. The geological room will contain the fossils, minerals, and other objects which belong to ancient life, and to the earth's crust respectively. The zoological room will contain those forms which appertain to recent life. The limited space available for such purposes makes work of this kind very slow.

The Council refer with much pleasure to the course of lectures which the Curator, Mr. Henry Crowther, has inaugurated this autumn. An influential local committee has been formed, with Canon Moor, one of the vice-presidents, as chairman, and Mr. Hamilton James, a member of council, as Hon. Sec. The subjects at present treated are geology, mineralogy, hygiene, and botany. The classes are immediately connected with the Science and Art Department, South Kensington, and are remarkably well attended, there being 33 names registered for botany, 24 for hygiene, 17 for mineralogy, and 12 for geology. These lectures are replete with teaching matter, and have the advantage of being based on university methods.

Great advantage has been derived by the society from the excellent work performed by Mr. Crowther, the Curator, in many ways, and not only have the council been pleased with his efficiency, but those visiting the Institution have expressed their satisfaction at the increased facilities which he has placed within their reach when studying the various collections.

The minerals collected by Major Parkyn, F.G.S., one of the Hon. Secs., during his three years' residence at the school of mines at Freiberg, in Saxony, and kindly presented by him to this society last year, have been laid out in the geological room preparatory to being added to the general collection.

It has been thought that it would add greatly to the interest of the collections if a few sets of minerals, illustrative of the districts from which they are derived, were displayed. Mr. James Osborne, F.G.S., one of the new members and a generous donor, has sent for this purpose a beautiful set of minerals from mines in Spain and Portugal. There are in addition to these some sent by Mr. Richard Pearce, F.G.S., from Utah, and others by Mr. T. Oates, from Chil ; they will be grouped in illustration of their respective localities.

The Rev. W. Hamilton, who is a specialist on Indian butterflies, has been kind enough to name about 140 species of those which were presented by the late General Jenkins, one of the original benefactors of the museum, more than 40 years ago. The Curator is now busily engaged in classifying and arranging them, with a view of publishing a small guide to their habits and distribution. A very valuable purchase has also been made in this department, which will greatly strengthen the collection.

When the notice concerning the picture of Anthony Payne, presented by Mr. Robert Harvey last year, appeared in the papers, many enquiries were made for particulars of the life of the Cornish giant. In consequence, a brief biography was written by Mr. Crowther, and sold in the museum at a small cost, with such success as will warrant the issue from time to time of small guides to the various collections in the museum.

The gifts to the museum have been very numerous. Mr. Richard Pearce, of Denver, Colorado, has, at a cost of ten guineas, presented us with the case for holding the Cornish minerals. Mr. Walter H. Harris has presented sets of models of historic diamonds, precious stones, and of mineral crystals to the museum. Mr. Robert Harvey, an engraving, in handsome frame, of Henry Rogers, the Pewterer of Helston, who defended property which he had seized, by killing five persons in the village of Skewis, in 1734-5. The Rev. R. F. Frazer-Frizell has given several

interesting objects which he acquired in Egypt, including a genuine model scarabæus, an alabaster vase, and ancient bronze coin. Mr. James Osborne has sent a beautiful collection of minerals, chiefly Spanish and Portuguese. Mr. Thos. Clark, slides of the Lizard Rocks. Mr. Albert H. Carlyon, of Truro, a model of an Indian canoe, minerals, and shells.

The greatest acquisition to the museum this year from any one person, has been the addition of the collection of shells of the late Rev. Wm. Rogers, of Mawnan, presented to the Society by his son, Mr. Ralph Baron Rogers, of Falmouth, a member of the Institution. They occupy eighteen drawers, and are of the utmost value to the museum, forming probably the finest collection of Cornish shells extant. There are also many valuable foreign specimens. It is proposed to set apart the Cornish portion as a memento of their patient collector; so that eventually the Institution will possess an additional county group of natural history objects, which will further attract visitors.

Dr. Rundle, a member of council, has generously presented two cases of beautiful Indian butterflies—a very valuable gift, which will materially contribute to the types required for the re-arrangement of the collection.

The Rev. W. Iago has procured for the society the portrait of Mr. Joseph Polsue, the writer of the *History of Cornwall*,* published in four volumes by Messrs. Lake and Lake, of Truro. It is gratifying to know that this likeness was taken expressly for the Institution, at the request of the Rev. W. Iago.

The Henwood Gold Medal has been conferred by the council on the Rev. W. Iago, B.A., for his paper on "Some Recent Archæological Discoveries in Cornwall," and will be awarded in the course of the meeting.

The last number of the *Journal of the Royal Institution of Cornwall* is treble the bulk of the ordinary issues, and its contents are of corresponding value. The Rev. W. Iago, contributes an illustrated account of rock markings, cinerary urns, Celtic, Roman, Saxon, Norman, and Mediæval remains, all being

* An Index to this work has been published by Mr. Boase in the commencement of his "*Collectanea Cornubiensia*," 1890.

discoveries of modern date, and several of great importance made by the author. This digest, which embodies in clear and attractive language the learning and insight of a great master of Cornish archæology, supplements previous text-books on the subject. For this valuable paper the Council have awarded the Rev. W. Iago the Henwood gold medal for 1890. Mr. Langdon's paper on "The Ornament on the Early Crosses of Cornwall," tabulates and classifies all existing crosses by interlaced work, incised and miscellaneous ornament and figure sculpture. A great advance upon previous writers has been made in the first-named or pattern work. This Celtic ornamentation has been illustrated by similar decorations on Irish, Scotch, and Welsh crosses, and by their aid classified systematically in groups. The Rev. A. H. Malan is the pleasant writer of two papers on Cornish Choughs, and Altarnon Church, of which he is the vicar; and Mr. Sincock has written on the principal landowners of Cornwall A.D. 1165. Mr. Collins, F.G.S., a former secretary of the Institution, has written "On the origin and development of ore deposits in the West of England"; and "The mineralogy of a portion of the Lizard district" has been thoroughly treated by Mr. T. Clark, A.M.S. Other subjects dealt with, include "The Treasure Ship of Gunwalloe," by Mr. H. Michell Whitley, F.G.S., editor of the journal. The scientific contributions are of unusual value. The frontispiece is an excellent wood engraving, the picture being a representation of Anthony Payne, the Cornish giant. The 'cut' was supplied at a cost of ten guineas, the expense being defrayed by Mr. Robert Harvey. The journal concludes with "A Year's Weather," by Mr. H. Crowther, Curator of the museum; and some interesting notes and queries.

The gifts to the Library include the handsome present by Mr. John D. Enys, F.G.S., of seventeen additional volumes of the British Association Reports, one of which is that issued for the present year. Mr. John Thomas, of Kensington Palace Mansions, has through the forethought of Mr. Silvanus Trevail, presented to our reference library, Part II. of Vol I. of the original MS. copy of Dr. Borlase's Natural History of Cornwall, in the old binding, a valuable acquisition; to this section of our

library, augmented last year by Dr. Jago of Saltash, Mr. Jeffery, one of our Vice-presidents, has presented the Diary in MS. of Miss L. Grenfell, which he has had neatly bound, and Mr. E. Opie of Plymouth, has sent two books in the Breton language. The Government of the United States of America has again forwarded several handsome donations of valuable Geological and Mineralogical Books; the Cornwall Library the first fifteen volumes of the Memoirs of the Royal Astronomical Society; and Mr. W. J. Clyma has given several old Maps, two being pictorial routes, one from Exeter to Truroe, and the other from Barstable to Truro. By the interest of Mr. H. Michell Whitley we have acquired by exchange, thirteen volumes of the Collections of the Sussex Archæological Society, and a handsome copy of the Sussex Domesday Book; and by the good offices of Mr. J. Langdon Bonython, the Proceedings of the Royal Geographical Society of Australia. We have again been able to extend our list of exchanges with other learned societies.

The weather observations have been taken daily, and duplicate copies regularly supplied to the Registrar General and to local papers. In answer to many inquiries respecting the weather letters, it may be stated that, it is proposed to resume the publication of others at the beginning of the coming year.

The Annual Excursion took place on the 4th of September, and was well attended. The party, numbering between forty and fifty, proceeded by steamer to the Helford River and visited Bosahan, where they were received by Mr. A. P. and Lady Jane Vivian, who kindly accompanied them over the gardens and grounds, and afterwards entertained them at luncheon in a marquee erected on the lawn. The house was next visited and its treasures were pointed out by Mr. Vivian,—his cases of minerals and fossils—his unique collection of birds and wild quadrupeds (almost every specimen of which fell to his own gun during his travels in many lands), and his extensive array of armour were greatly admired. On leaving Bosahan, the ancient church of St. Anthony was examined, and the recent restoration was explained by the Rev. W. Fox, who superintended it. Manaccan was next visited, and the church inspected; much interest was felt in the fig-tree, said to be 200 years old,

growing out of the south wall. The hagioscope, aumbry, and other relics, were carefully preserved when this church was restored under the superintendence of the Rev. Preb. Hingeston-Randolph. The party next proceeded to Tregonwell stream, where in 1791 the Rev. W. Gregor discovered in a ferruginous sand the mineral known as Manaccanite, from which the element Titanium was first reduced. The village of Helford was next reached, whence the party re-embarked and safely returned home about eight o'clock.

The President having been elected for two years has still one year to serve.

The following are nominated as Vice-Presidents :

DR. JAGO, F.R.S.	MR. HENRY MARTIN JEFFERY,
REV CANON MOOR, M.A., M.R.A.S.,	M.A., F.R.S.
F.R.G.S.	MR. JOHN TREMATNE.
REV. W. JAGO, B.A.	

As other Members of the Council:

THE VEN. ARCHDEACON CORNISH,	MR. E. M. PAUL, M.A., (CHANCELLOR
M.A.	OF THE DIOCESE).
MR. HOWARD FOX, F.G.S.	MR. EDMUND RUNDLE, F.R.C.S.I.
MR. HAMILTON JAMES.	REV. A. R. TOMLINSON, M.A.
REV. A. H. MALAN, M.A.	MR. ROBERT TWEEDY.
MR. F. W. MICHELL, C.E.	MR. WHITLEY, F.R.Met.S.

Treasurer :—Mr. A. C. WILLIAMS.

Hon. Secs. :—Mr. H. MICHELL WHITLEY, F.G.S., & MAJOR PARKYN, F.G.S.

GIFTS TO THE LIBRARY.

Presidential Addresses to the Colorado Scientific Society	Richard Pearce,
	Colorado, U.S.A.
Boyhood, Adolescence, and Youth, by Leon Tolstoi ...	Constantine Popoff.
The Forest Flora of South Australia. Part IX....	The Agent General,
	South Australia.
Quarterly Returns of Births, Marriages, and Deaths ...	Registrar General.
How Readest Thou ? ...	} Edward Dingle.
The Earth's Ecliptic Angle... ..	
The Balance of Physics	
Reports of British Association, 1869, 70, 71, 74, 77, 78, {	} John D. Enys, F.G.S.,
79, 80, 81, 83, 84, 85, 86, 89	
	New Zealand.
South Australian Cornish Association (pamphlet) ...	J. Langdon Ronython.
Considérations Santel (in the Breton Language) ...	} E. Opie, Plymouth.
Livr el Labourer (do. do.) ...	

Church Plate of the County of Dorset	J. E. Nightingale, F.S.A., Salisbury.
St. Richard the King of Englishmen	Thomas Keralake, Clevedon, Somerset.
Smithsonian Reports, 1886, 1887	
U.S. Geo. Sur., Seventh Annual Report, Pts. 1 & 2 ...	The Government of the United States of America.
U.S. Geol. Sur., Eighth Annual Report, Pts. 1 & 2 ...	
" " " Monograph XV., Pt. 1 text, Pt. 2 plates }	
" " " Bulletins, 54, 55, 56, and 57.	
The Original MS. of Borlase's Natural History of Cornwall, Pt. II.	John Thomas, Trewince.
Map of Road from Exeter to Truroe (John Ogilby) ...	W. J. Clyma, Truro.
" " " Barstable to Truro (do.)	
" " " Ancient Rome	
On the Identity of the Nodes of a Nodal Curve	H. M. Jeffery, F.R.S.
Extracts from the Diary of Miss L. Grenfell... ..	
Original MS., bound, of the Diary of Miss L. Grenfell }	
Glasney College, Reprint of Lecture on	
Comparison of the Places of the Moon deduced from Burckhardt's and Hansen's Tables	Royal Astronomical Society.
Recomputation of the position of the Ecliptic and corrections to refractions of Stars	The Astronomer Royal, Greenwich.
Reduction of Greenwich Meteorological Observations, Pt. II	
Greenwich ten-year Catalogue of 4,059 stars for 1890 }	
Portrait of Joseph Polsue, the writer of Lake's History of Cornwall	Joseph Polsue, Totnes.
Indigenous Grasses of New Zealand, Pts. I, II, III, IV, V, VI	Sir James Hector, the Director of the Colonial Museum of New Zealand, Wellington.
Manual of Indigenous Grasses of New Zealand	
Do. Birds of New Zealand	
Do. Mollusca do.	
Do. Coleoptera of New Zealand, Pts. I, II, and III	
Catalogue and Description of Diptera, Orthoptera, and Hymenoptera of New Zealand	
Catalogue of Flax Exhibition of New Zealand	
Do. Colonial Museum Library of New Zealand	
Meteorological Reports, 1868, 70, 73, 75, 77, 80, 85 ...	
Phormium tenax as a fibrous plant	
Museum Reports, Nos. 3, 9, 12, 13, 16-20, 22-24,	
Geology of the Thames Gold Field, New Zealand... ..	
Geological Reports New Zealand, 1873-4, 74-6, 76-7, 79-80, 81, 82, 83-4, 85, 87-8, 88-9... ..	
Index to Geological Reports New Zealand, 1866-85 ...	
Fossil Corals and Bryozoa of New Zealand	

Sussex Archaeological Collections, Vols. XXVI-XXXVII, and General Index, 1-XXV	Sussex Archaeological Society.
Domesday Book in relation to the County of Sussex ...	
History of the Manor & Advowson of Clifford Chambers ...	Sir John Maclean, F.S.A.
Parties Riches des Filons, par M. L. Moissacmet	Richard Tangye, Glendorgal.

PRESENTS TO THE MUSEUM.

Case of the value of ten guineas to hold the Cornish Minerals.	Richd. Pearce, F.G.S., Denver, Colorado.
Cast of Seal	
Specimens of Chalcedony and Egyptian Jasper from neighbourhood of Suez Canal	Capt. Pinwill, Trehane.
Burmese Manuscript on papyrus	John Edwards, Truro.
Sets of Models of Historic Diamonds and Precious Stones	Walter H. Harris, London.
Set of Models of Mineral Crystals	
Twenty-four Microscopical Slides—Rocks of the Lizard	Thomas Clark.
Contorted Hornblende Schist, Porthallow	
Model of Sacred Beetle (<i>Scarabæus</i>) from the Upper Nile	Rev. B. F. Fraser- Frizell, Chacewater.
Small Alabaster Vase from the Temple of Rameses II, at Abydos	
Large Bronze Coin of Ancient Egypt	Samuel Pascoe, Truro.
Specimens of Iron Pyrites, Copper Ore and Quartz, from Cornish Mines	
Fossil Specimens of <i>Lima elegans</i> , Lias; <i>Limnaea</i> <i>longiscata</i> and <i>Planorbis cuomphalus</i> , Oligocene; and <i>Pecopteris</i> , Carboniferous formation	Dr. Rundle, Truro.
Four Specimens of <i>Helix vermiculatus</i> , from Syria, collected by the donor	
Specimens of Schorl from St. Just	Capt. Bryant, Truro.
An Old Engraving of Henry Rogers, the Helston pewterer, in frame	Robert Harvey, London.
Miner's Pipe from Padstow	Luke J. Dresser, Padstow.
Four Specimens of Oak Butterfly, <i>Kallima inachis</i> Boisd, India	Rev. W. A. Hamilton, Truro.
Model of Canoe from Nova Scotia, British North America, with dressed figures of Natives	
Two Specimens of <i>Nautilus pompilius</i> ; unique speci- men of crystallized Pyrites shewing combinations of octahedra and cubes; specimen of Mesolite; Elephant's tooth, &c.	Albert H. Carlyon, Truro.

Specimens of Minerals—Fahlerz and Chalcopyrite; Iron Pyrites shewing Slickenside; Galena and Copper Pyrites; Redruthite on Iron Pyrites; Peacock Ore, Vein of Chalcopyrite in Iron Pyrites; Brochantite investing Iron Pyrites; Vein of Galena in Iron Pyrites; Galena, Chalcocite, Erubescite, and Iron Pyrites; Galena, Chalcocite, Erubescite, Iron Pyrites and Anglesite; Galena and Erubescite; Erubescite; Chalcocite (steel grey); Sulphides of Lead, Zinc, Copper, and Iron Oxide on Quartz; Chalcopyrite; Covellite, Chalcopyrite and Quartz; Chessylite, Malachite and Grey Sulphide of Copper; Chessylite; Covellite and Copper Pyrites; Covellite, Yellow Ore, and Galena; from Rio Tinto. Jamesonite from Alajar; Micaceous Hematite; Pyrrhotite or Magnetic Pyrites from Province of Huelva. Calcite; Galena; Malachite; Malachite & Chessylite—Mina Preciosa, Province Sevilla; Chloanthite—La Aurora Mine, Province Sevilla; Hematite from Zalamea; Wolfram & Quartz from Valencia; Magnetite from Aracena; Mispickel from South of Spain; Selenite from Alicante; Calcite from Niebla; Antimonite or Stibnite from Cordova; Blende and Quartz; Chalybite; Galena and Blende and Hematite from the Portuguese Mines; Manganese Ore from Porti on the Black Sea

James Osborne, C.E.,
F.G.S., Truro.

Roman Lamp and a Roman Poll-pick from the deserted workings of Rio Tinto Mines, Spain

Fossil Fish (*Percidæ*) in frame, from a Limestone formation in the Rocky Mountains

Eighteen Drawers of British and Foreign Shells, being the collection of the late Rev. William Rogers, of Mawnan Sanctuary. The collection is exceedingly rich in Cornish specimens, over 100 species being from Helford River alone; amongst these is a fine series of *Aporrhais pes-pelecani*, L. shewing various stages of growth; *Pinna rudis*, L., *Lima hians*, G., *L. Loscombi*, Sow., *Venerupis Irus*, L., *Isocardia Cor*, L., *Emarginula rosea*, Bell.

Ralph Baron Rogers,
Falmouth.

Specimen of *Pholas dactylus*, L., from the Cornish coast, shortened by coming in contact with quartz, when boring in the killas.

From the Sanctuary gardens a fine specimen of *Helix aspersa*, L., var *scalaris*.

From Perranporth large examples of the Violet Snail, *Ianthina communis*, Lk.

Specimens of Fossils, Minerals, &c.... ..

PURCHASED.

Monograph of the Palaeontographical Society.

Monograph of the Ray Society.

The Western Antiquary.

Symon's Monthly Meteorological Magazine.

Journal of the Meteorological Society.

Liverpool Naturalists' Field Club	Liverpool.
Liverpool Polytechnic Society	Liverpool.
London and Middlesex Archaeological Society...	London.
Manchester Geological Society	Manchester.
Meriden Scientific Society	Meriden, Conn., U.S.A.
Mining Association and Institute of Cornwall	Tuckingmill.
Mineralogical Society of Great Britain	London.
Natural History Society of Glasgow	Glasgow.
New York Academy of Sciences... ..	New York.
North of England Institute of Mining and Mechanical Engineers	Newcastle-upon-Tyne.
Nova Scotian Institute of Natural Science	Halifax, Nova Scotia, Canada.
Patent Office	London.
Penzance Natural History and Antiquarian Society ...	Penzance.
Philosophical Society of Glasgow	Glasgow.
Plymouth Institution	Plymouth.
Powys-land Club	Welshpool.
Quekett Microscopical Club	London.
Royal Astronomical Society	London.
Royal Cornwall Polytechnic Society... ..	Falmouth.
Royal Dublin Society	Dublin.
Royal Geographical Society of Australia	Adelaide.
Royal Geological Society of Cornwall	Penzance.
Royal Geological Society of Ireland... ..	Dublin.
Royal Historical and Archaeological Society of Ireland	Dublin.
Royal Institution of Great Britain	London.
Royal Irish Academy	Dublin.
Royal Physical Society of Edinburgh	Edinburgh.
Royal Society of Edinburgh	Edinburgh.
Seismological Society of Japan	Yokohama.
Smithsonian Institute	Washington.
Society of Antiquaries of London	London.
Society of Arts	London.
Société Mineralogique de France	Paris.
Somersetshire Archaeological & Natural History Society	Taunton.
Sussex Archaeological Society	Lewes.
Wagner Free Institute of Science	Philadelphia.
Y Cymrodorion Society	London.
Yorkshire Geological and Polytechnic Society	Halifax.
Zoological Society of London	London.

The following Balance Sheet has been prepared by the Treasurer.

Dr. Arthur C. Williams, in account with the Royal Institution of Cornwall. Cr.

1890.		1899.	
	£ s. d.		£ s. d.
To Interest on Deposit Notes	... ..	By Balance ... ..	... ..
" H.R.H. Prince of Wales ...	31 4 7		8 0 11
" Subscriptions	20 0 0		
" W. H. Harris	140 9 6	By Curator	64 16 0
" R. Pearce	10 10 0	" Fire Insurance	2 14 0
" Visitors' Fees	10 10 0	" Meteorological Society ...	1 0 0
" Sale of Journals	8 18 6	" Nature	1 9 6
" Excursion	4 10 0	" Paleontographical Society	1 1 0
" Interest (Henwood)	22 16 9	" Repairs to Building	10 10 8
" " "	40 13 10	" Bay Society	1 1 0
" Sundry Receipts	36 8 2	" Zoologist	0 13 0
	2 3 0	" Taxes	2 10 0
		" Rainfall, &c.	0 10 0
		" Excursion	24 17 10
		" Museum Expenses	26 8 9
		" Printing, &c.	96 9 6
		" Sundries	18 18 2
		" Henwood Medal	14 13 9
		Balance	59 9 8
Balance	453 9 8		4328 2 4

On the motion of Capt. Henderson, seconded by Mr. John Lake, it was resolved that the report be received, adopted, and printed.

The Henwood Gold Medal was then awarded by Mr. H. M. Jeffery, Vice-President, to the Rev. W. Iago, B.A., for his paper on "Recent Archæological Discoveries in Cornwall."

The following papers were read :—

Mr. E. A. Wünsch, F.G.S. "On a New Method of representing Botanic Structure."

The Rev. W. Iago, B.A. "On the Stamping of Blocks of Tin." Mr. H. S. Stokes in speaking on this paper, at the request of the chairman, told of his first acquaintance with blocks of tin in the Coinage Hall, Truro, in 1832, and enumerated some of the changes in customs and in buildings since then in Cornwall.

Mr. Henry Crowther. "The Pozo Pictorial Inscribed Stone."

Mr. Thomas Clark. "Notes on the Lizard Rocks." Mr. H. W. Vinter, M.A., read this paper in Mr. Clark's absence.

Mr. Henry Crowther. "The Indian Butterflies in the Truro Museum."

Mr. A. Hamilton Norway. "The Falmouth Mutiny of 1810." In the absence of the writer, this paper was read by Mr. Jeffery.

On the motion of Mr. John Barrett, seconded by Mr. F. A. Cozens, a vote of thanks was accorded the authors of the papers, and the donors to the library and museum.

It was resolved on the motion of Mr. S. Pascoe, seconded by Capt. Bryant, that the gentlemen named in the annual report constitute the officers for the ensuing year.

A vote of thanks to the chairman, on the motion of Capt. Henderson, seconded by Mr. S. Rogers, and to Major Parkyn, Hon. Sec., on the motion of the Rev. W. Iago, seconded by the chairman, brought the meeting to a close.

The Members and their friends partook of refreshments provided in the reading room, at the close of the Meeting.

PRESENTATION OF THE HENWOOD MEDAL.

November 25th, 1890.

In the absence of Mr. Dunkin, F.R.A.S., the President, Mr Jeffery, M.A., F.R.S., a Vice-President, had been nominated by the Council to preside at the Annual Meeting. He delivered the following address.

The late Mr. W. J. Henwood, F.R.S., a former President of the Royal Institution of Cornwall, left by will in 1872 the sum of £200 to defray the cost of a gold medal, which should be triennially awarded by the Council of the Institution to the most valuable memoir contributed and printed in the Journal of its Proceedings during the interval between the successive presentations. The range of subjects selected by the donor for competition is wide, and embraces Natural Science, notably Mineralogy, in which Mr. Henwood was pre-eminently versed, Natural History and Archæology; but all of them, however diverse, are restricted by the terms of his bequest to the illustration of his native county of Cornwall.

The first selection, and award, have been made this year by the Council, and its choice has fallen on the Rev. W. Iago, B.A., Corresponding Member of the Society of Antiquaries, London, and a past President of this Institution. The most scrupulous care was taken in weighing the comparative excellencies of the authors, who have written with power in the Journal on widely differing subjects during the preceding three years. In order to mature their own judgment in the last resort, the Council had adopted the practice of eminent contemporary Societies in submitting each remarkable paper to two qualified referees, eminent in their several departments of study.

Some comment may not be misplaced on the work of the first Gold Medalist. As its title professes, the essay may be regarded as a report on Recent Archæological Discoveries in Cornwall, and may be likened to those reports on recent advances in various branches of science which are annually presented to the British Association, both by individuals and by committees, and are justly regarded, as precious and permanent fruits of their labours.

Mr. Iago's report is not yet concluded. Of its three main divisions, on Prehistoric, Celtic, and Roman Cornwall, the two former are treated completely; but, although the Roman occupation is examined minutely and copiously, his stores of pertinent information are not exhausted. Accordingly we are promised further discussion of Roman and Romano-British inscriptions,—in particular, of his own memorable discovery of the Tintagel stone, inscribed in honour of the Emperor Licinius. (We are also glad to notice that a further report is announced for the succeeding periods, viz: on Anglo-Saxon, Norman, and Mediæval inscriptions found in Cornwall.)

First in order, Mr. Iago has discussed the novel subject of Prehistoric Man in Cornwall; and illustrated the Rock Markings near Newquay and further west, by similar indications recorded in the North of England, and the continent of Europe. Here, as elsewhere, the learned author fairly and impartially states the various suggestions made to account for these phenomena, adding brief comments for the guidance of the reader.

Two Celtic cinerary urns, which have been unearthed since 1872, next receive the author's attention. Every incident is carefully noted. The dimensions, the ornamentation, the contents, the earth-cast with its environment, are minutely described, illustrated by reference to similar urns, and sketched, so that an antiquary or student at a distance has all the necessary information within reach. It will be seen that from scattered potsherds, the author has placed in evidence the urn itself, with skill and insight, just as a palæontologist reproduces a megatherium from a few of its fossilised bones.

In treating of Roman remains, Mr. Iago has evinced wide research in collecting his data, and caution in drawing his conclusions. After proposing for consideration the vexed question,—'What was the extent of the Roman occupation of Cornwall?'—he first tabulates incontrovertable facts, and then, while he admits the absence of Roman villas and altars, such as are found (say) in Somersetshire, he proceeds to establish a continuous military occupation, coupled with general commerce and special traffic in the minerals of the county. Nowhere is greater ability shewn than in connecting the two series of

quadrate camps in the interior with the coast. The two main entrenchments, at Tregear, near Bodmin, and at Bossens, in St. Erth, are first elaborately proved by their shape and contents to be Roman, then faint indications are pursued to detect the affiliated camps, which kept up the communications with the coast, so that the original plan of operations is made clear.

This clue once found unravels all the rest,

The prospect clears, and Wharton stands confest.—*Pope*.

The vicinity of British round camps is thereby explained, and the Cornish nomenclature of the sites elucidated. Similar working hypotheses may hereafter be framed to account for other groups of camps, notably those which occur in the Grampound district.

In conclusion Mr. Jeffery noticed generally, throughout the memoir, the wealth of pertinent antiquarian information, which has been culled both from within and from without the county, alike from the older as from the newer authorities, and marshalled in good literary form to illustrate the recent discoveries in local archæology. As Sir Warrington Smyth stated at Plymouth, before the British Association, that all students of the mineralogy of Cornwall must master the works of Mr. Henwood and Sir Henry De la Beche, so he, the speaker, would advise students of the recent development of Cornish Archæology, to familiarise themselves with the writings of Sir John Maclean and Mr. Iago, of which the present prize-essay is a conspicuous specimen.

He felt great pleasure in conferring, in the name of the Society, the first Henwood Gold Medal on Mr. Iago.

The Rev. W. Iago, in accepting the medal, thanked all present for the honor conferred on him. It gave him additional pleasure to receive it from so eminent a scientist as the Chairman—Mr. Jeffery having been greatly distinguished at Cambridge in Mathematics, Hebrew and Classics. His elucidation of difficult problems was still being continued. The Archbishop, when President, spoke of him as a high authority.

With reference to Archæology, Mr. Iago stated that Cornish antiquities had long been his favourite study. Bronze and silver medals had been awarded him for other subjects, and now this gold medal would complete the series. President Henwood, the deceased donor, had been his esteemed friend, therefore with the medal were many pleasant associations.

TABLE No. 1.

*Summary of Meteorological Observations at Tyuro, in Lat. 50° 17' N., Long. 5° 4' W., for the year 1890,
from Registers kept at the Royal Institution of Cornwall.*

MONTHLY MEANS OF THE BAROMETER. Clifton 48 feet above mean sea level.																		
Month.	Mean pressure corrected to 32 deg. Fahr. at sea level.			Mean of monthly means.	Mean correction for diurnal range.	True mean of monthly means.	Mean force of vapour.	Mean pressure of dry air.	Corrected absolute maximum observed.	Day.	Corrected absolute minimum observed.	Day.	Extreme range for the month.	Mean diurnal range.	Greatest range from 9 a.m. to 9 p.m.	Day.	Greatest range in any 24 consecutive hours.	Between which days it occurred.
	9 a.m.	3 p.m.	9 p.m.															
January	ins. 29-940	ins. 29-940	ins. 29-941	ins. 29-940	ins. 0-004	ins. 29-938	ins. 29-939	ins. 29-932	ins. 29-900	30	ins. 29-170	23	ins. 1-380	ins. 1-122	ins. 76	23	ins. 98	23 & 24
February	30-112	30-101	30-101	30-105	0-003	30-102	29-907	29-901	30-573	23	29-588	16	1-035	1-125	82	19	53	19 & 20
March	29-881	29-881	29-894	29-888	0-007	29-881	237	29-632	30-451	8	29-180	16	1-371	1-120	31	23	72	23 & 24
April	29-807	29-800	29-801	29-803	0-004	29-799	244	29-625	30-203	1	29-243	15	0-960	1-123	31	24	46	19 & 20
May	29-793	29-794	29-799	29-796	0-003	29-793	311	29-494	30-207	23	29-393	10	0-814	0-90	29	13	31	11 & 12
June	30-028	30-018	30-012	30-019	0-001	30-018	365	29-654	30-406	15	29-394	30	1-083	0-86	34	29	63	29 & 30
July	29-914	29-921	29-932	29-922	0-002	29-920	402	29-631	30-254	20	29-537	1	0-757	0-69	54	23	80	23 & 24
August	29-927	29-928	29-937	29-931	0-004	29-927	396	29-552	30-256	4	29-507	26	0-749	0-62	23	27	42	27 & 28
September	30-135	30-119	30-112	30-122	0-004	30-118	415	29-709	30-474	26	29-401	20	1-073	0-77	28	13	33	23 & 24
October	30-150	30-146	30-149	30-149	0-006	30-143	349	29-809	30-501	23	29-631	31	0-870	0-70	30	2	64	23 & 24
November	29-923	29-928	29-929	29-927	0-004	29-923	271	29-315	30-564	20	29-320	10	13-44	0-62	31	30	44	25 & 26
December	29-958	29-963	29-961	29-960	0-003	29-957	181	29-774	30-293	24	29-635	19	0-658	0-73	24	20	46	23 & 24
Means	29-964	29-962	29-964	29-963	0-004	29-959	302	29-637	30-392		29-405		0-966	0-66	34		56	

REMARKS.—The Barometer used is a Standard, made by Barrow, and compared with the Standard Barometer at the Royal Observatory, Greenwich, by Mr. Glaisher. The corrections for Index Error +0-003, Capillarity (+0-018), height above sea (48 feet), and temperature, have been applied.

TABLE No. 3.

1890.		WINDS.																										
Month.	N.	S.E.			S.			S.W.			W.			N.W.			N.			N.E.			AVERAGE FORCE.					
		h	d	e	h	d	e	h	d	e	h	d	e	h	d	e	h	d	e	h	d	e	h	d	e			
January	0	0	0	0	0	3	19	18	17	3	4	5	1	0	0	5	4	3	4	2	20	20	23	21				
February	1	2	1	8	3	2	4	3	7	5	7	0	0	3	1	2	4	6	5	8	7	8	16	15	17	16		
March ...	1	0	1	1	1	0	4	9	9	7	3	3	3	9	9	7	6	6	5	2	3	3	17	15	19	17		
April ...	1	3	4	8	5	3	0	1	5	4	5	4	3	2	1	5	5	7	8	9	6	1	0	22	20	21	21	
May ...	4	4	1	5	3	5	2	4	5	12	11	10	1	1	1	2	1	6	5	4	1	2	19	16	18	18		
June	1	2	1	0	0	0	1	1	2	6	4	6	6	4	9	11	6	5	5	10	2	1	1	16	15	14	15	
July	0	0	0	0	0	0	1	4	5	7	6	6	4	3	4	3	3	5	13	13	11	2	2	0	17	15	17	16
August ...	3	1	2	1	1	1	0	1	2	5	7	6	2	3	2	6	5	2	4	4	11	10	9	5	16	16	15	16
September	3	4	2	3	2	4	3	4	4	11	10	8	2	2	1	1	2	3	3	1	5	4	5	3	16	15	16	16
October ...	4	1	2	3	2	3	0	6	5	6	3	3	0	1	2	6	8	7	6	6	7	6	4	2	17	15	16	16
November	0	0	0	0	0	0	0	2	2	11	10	9	0	3	2	10	7	7	5	4	6	3	4	4	17	17	20	18
December	1	0	2	3	4	2	2	0	3	12	12	11	1	0	1	4	4	2	1	6	3	6	5	7	14	13	13	13
Total	19	17	16	87	21	21	11	27	43	106	100	94	25	28	26	59	56	50	61	71	78	51	45	87	207	192	209	203
Means ...	173	23°0			27°0			101°0			26°3			55°0			70°0			44°3			17	16	17	17		

The force of the Wind is estimated on a scale from 0 to 6, from calm to violent storm.

TABLE 4.

1890.

WEATHER.

Month.	AVERAGE CLOUDINESS.	Rainfall in inches.	RAINFALL.	Mean weight of vapour in cubic foot of air.	Mean additional weight required for saturation of the air.	Mean humidity of atmosphere.	Mean elastic force of vapour.	SUR.	Dry.	Wet.	REMARKS.							
	9 a.m.	3 p.m.	9 p.m.	Mean.				No. of days in which rain fell.										
								Truro.										
								Depth.	Date.									
January	8.4	6.4	7.6	6.8	5.63	28	0.68	21	0.68	21	73	268	16	11	35	49	44	Frost 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31. Hail 17, 18, 20, 21.
February	5.2	4.7	6.4	5.4	1.84	12	0.50	12	2.39	1.2	65	202	30	3	23	74	10	Hail 16. Frost 2, 4, 5, 6, 7, 23, 24. Fog 23, 24, 25.
March	5.2	4.9	6.7	5.6	1.87	17	0.68	23	2.66	1.2	67	231	32	12	18	74	19	Hail 5, 10, 17, 18, 25. Frost 1, 2, 3, 4, 5, 6, 10, 17, 18, 21. Snow 1. Fog 23.
April	5.5	4.9	6.9	5.8	4.01	19	0.90	21	2.76	1.7	53	241	36	11	13	71	19	Remarkable Rain 21, 24. Frost 2, 4, 5, 11, 12. Hail 10, 11. Thunder 14.
May	5.6	5.2	6.9	5.9	5.06	23	0.83	3	3.44	1.7	65	308	37	11	14	62	31	Remarkable Rain 2, 4, 24. Thunder 24.
June	6.4	5.6	7.0	6.4	4.17	20	1.04	11	4.10	1.6	71	362	39	13	8	65	25	Remarkable Rain 11.
July	6.5	6.0	7.6	6.7	3.67	19	0.92	16	4.55	1.7	72	400	33	13	17	64	29	Remarkable Rain 7, 14.
August	5.5	5.7	6.9	6.0	3.79	17	0.92	9	4.39	2.1	67	333	42	9	11	76	17	Remarkable Rain 9, 14. Thunder and Lightning 6. Hail 27.
September	5.3	4.9	6.5	5.6	2.63	10	1.25	17	4.55	1.8	72	413	45	5	10	77	13	Remarkable Rain 17.
October	5.5	5.1	6.7	6.0	3.03	16	0.61	26	3.63	1.5	70	338	44	6	12	72	21	Fog 10, 11, 23. Hail 26, 27. Thunder and Lightning 21.
November	6.3	5.9	7.5	6.6	4.35	25	0.67	10	2.97	1.1	73	360	25	14	21	56	34	Hail 7, 14, 24, 25. Frost 10, 27, 28. Fog 11.
December	7.1	7.0	7.7	7.3	5.07	21	1.08	23	2.05	1.1	66	179	24	11	27	62	31	Fog 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31. Remarkable Rain 4, 10, 11, 27. Frost 1, 2, 3, 4, 5, 12, 13, 14, 15, 16, 17, 18, 21, 24, 27, 28, 30, 31.
Means	5.9	5.5	7.3	6.2	45.10	236	0.84		8.40	1.53	68	239	28.1	9.8	17.4	67.0	24.4	

Cloudiness is estimated by dividing the sky into ten parts, and noting how many of these are obscured. The rain gauge at Truro is placed on the flat roof of the Royal Institution, at about 60 feet from the ground. "Glean" is recorded when the sun's dial is visible through a film of cloud.

COMPOSITION BETWEEN THE VICAR OF GLUVIAS AND THE
BURGESSES OF PENRYN, A.D. 1322.

Communicated by J. D. ENYS, with introduction by H. M. JEFFERY, Vice-President.

This deed contains the judgment of the Bishop's deputy respecting two subjects of dispute, (1) the portion of the oblations or contributions received in the chantry of the chapel of the Virgin Mary in the town of Penryn, which was due to the Vicar of the mother church of Gluvias; (2) the best upper-garments of the dead, which seems to have been an unusual claim. The Bishop's court was held in Glasney College; the vicar of St. Gluvias pleaded in person, the vicar of the Collegiate church of Glasney, a townsman, (Sir Andrew de Penryn) represented the Burgesses, and judgment was given by the Official or Deputy of Bishop Stapeldon. (Bp. 1308-1326).

The deed belongs to J. D. Enys, Esq., of Enys, who procured a legible transcript and a translation from Mr. John A. C. Vincent in 1877.* The copies of both documents—the latter of which is hereinafter printed—were sent to this Institution by Mr. S. Enys, last year when, he paid a short visit to England from Australia, and enriched the Institution with many valuable presents.

* This gentleman also translated the Cartulary of Glasney Colleges for Mr. Jonathan Rashleigh of Menabilly, its present possessor, who published it in the *Journal of the Royal Institution of Cornwall*, Vol. VI, p. 213.

TRANSLATION.

Composition between the Vicar of Gluvias and the Burgesses of Penryn upon the Chantry of the Chapel of the Blessed Virgin Mary of Penryn aforesaid.

Be it remembered That Whereas between Sir Stephen Perpetual Vicar of the parish church of Saint Gluvias near Penryn of one part and the Commonalty of Burgesses and other the townsmen living in the Borough of Penryn of the other part matter of dissension had arisen upon a certain Chantry which the aforesaid Burgesses claimed to have in the Chapel of the Blessed Mary of Penryn at their expenses and upon offerings made in the Chapel aforesaid and upon legacies left to the said chapel, also upon the upper garment which the same Vicar claimed to have from every one dying in the Borough aforesaid, due (as he asserts) by authority of ancient custom. At length the said Vicar in person and the said Commonalty of Burgesses of the town of Penryn aforesaid by Sir Andrew de Penryn, Vicar of the collegiate church of Glasney, Syndic and Proctor of the Commonalty aforesaid (the tenor of whose Procuratory from word to word is contained below) spontaneously appeared before us the Official of the Peculiar Jurisdiction of the Venerable Father in Christ the Lord Bishop [of Exeter], sitting in the said Lord Bishop's Court constituted at Glasney for a Tribunal on Friday next after the Feast of Saint Faith Virgin in the year of Our Lord one thousand three hundred and twenty two and before us the Official aforesaid, of certain knowledge, intervening between the said parties as Author of peace upon the claims contentions and dissensions abovesaid, of their own free will acknowledged peace to be thus reformed, that is to say, through the whole year—the days above* written excepted, namely; Christmas-day with the morrow, Easter-day with the morrow, Whit Sunday with the morrow, the Feast-day of All-Saints with the morrow, the day of the Circumcision, the day of the Epiphany, the day of the Ascension of Our Lord—with-

* Obviously for ' under ' written.

out gainsaying of the Vicar aforesaid and his successors ~~That~~ the Chaplain celebrating in the chapel aforesaid shall receive yearly of the goods of the chapel for his Stipend twenty-four shillings. ~~That~~ the same chaplain with the consent of the said Vicar shall be presented by the said Burgesses to the Ordinary of the place and admitted (as the custom is) by the said Ordinary to the Chantry aforesaid. ~~Also that~~ the said Burgesses shall have and receive all and singular the legacies howsoever left to the said Chapel and all offerings at the said Chapel as well in candles as in ready money—except the offerings which are in the said chapel when the body there present of any person defunct is to be buried at the mother church or elsewhere, and except offerings made on Easter-day in the said Chapel by strangers communicating in the same church, which offerings are to be wholly reserved to the said Vicar and his Successors—for twelve pence sterling by the said Burgesses to the said Vicar and his successors on the day of Saint Gluvias aforesaid, of the goods of the said chapel in token of subjection duly made to the said mother church on the Great Altar of the parish church of Saint Gluvias aforesaid to be paid. ~~And that~~ if the said Burgesses fail in payment of the said twelve pence to be paid at the terms before-named it shall then be lawful for the said Vicar and his successors by fit ecclesiastical censure to be by the same exercised against them without* judicial clamour and fashion of judgment also by suspension of the chantry aforesaid to force and compel the Burgesses aforesaid to the full payment of the aforesaid money so due. ~~Moreover~~ the said Vicar and his successors who shall be for the time Vicars there shall receive and peacefully have the best upper garment† of every one who at his decease is serving or lodged howso-

* Absque steepita judiciali et figurâ judicis—Bustle and form of trial.

* Cloak or doublet. Mr. Vincent thinks all persons serving in any capacity are included. He pronounces the claim, to be unique. Mr. Enys quotes in illustration of this claim, Fronde, Hist. of England, Vol. I, p. 26, Ed. 1856 :—“No velvet cloak should be stripped any more from strangers' bodies to save them from a rector's grasp.” (Hale Precedents, p. 86).

ever in the said Borough as of ancient custom due to him and his said church without gainsaying of the aforesaid. So that others living in the said Borough, that is to say, Burgesses, Taxpayers, Cottagers, their wives, sons and daughters shall be from the bestowal of such upper garment free and exempt for ever. ~~Moreover~~ the aforesaid parties acknowledged before us the official aforesaid that they, so far as in them hereto lies, for them and their successors will firmly observe the aforesaid form of peace in all its articles for ever. ~~Whereupon~~ we the official aforesaid having followed the spontaneous confessions of the said parties well and truly before us declared do pronounce sentence, decreeing that our said sentence, if need shall require, be executed on due demand made. ~~Given~~ under the Seal of our office the day place and year of our Lord abovesaid. The tenor truly of the Procuratory, of which mention is above made exists thus : ~~Be~~ it manifest unto all by these presents that we Laurance Bastarde, Bartholomew Seneschelle, Ralph de Leo, John Urban and Amideus Tailor, Burgesses of the town of Penryn, with the assent and consent of the greater and elder part of the Commonalty of the town aforesaid, do make and constitute our beloved in Christ Sir Andrew de Penryn, Vicar of Glasney, our Syndic and Proctor to negotiate, compound and make peace in our name with Sir Stephen Perpetual Vicar of the parish church of Saint Gluvias upon the chantry in the Chapel of the Blessed Mary of Penryn and upon the offerings made therein and afterwards to act and upon all things, whereon between Sir Stephen Vicar aforesaid of one part and the Commonalty of the town [aforesaid] of the other part controversy and contention have been moved, peace being so reformed between Sir Stephen the said Vicar of the church aforesaid and the said Commonalty, to acknowledge before a Judge Ecclesiastical the said peace and the way and form of the same ; also in our name to undergo free condemnation as to observing faithfully on our part the peace aforesaid, and moreover to execute all and singular the things without which the premises cannot be expedited

as much as our special mandate shall require, holding firm and valid whatsoever in the premises and things contingent thereto the said Sir Andrew our Proctor shall cause to be done. ~~And this~~ unto all, whose interest it may be, we do upon pledge of our possessions promise by these Presents. ~~In Witness whereof~~ the Seal of the Officialty of the Peculiar Jurisdiction of the Lord Bishop of Exeter is at request made of us unto these Presents appended. ~~Given~~ at Penryn Burgh the eighth of the Ides of October in the year of Our Lord One thousand three hundred and [twenty]* two.

* Some discrepancy is observed as to the date, the explanation of which is :— For the year A.D. 1322, by taking either the 8th day before the Ides of October, or Friday after the Feast of S. Faith Virgin (which fell on Wednesday, 6th October), we arrive at the same date, viz., Friday, 8th October, 1322 ; whereas in A.D. 1302 8 Id. October fell on Monday, and Friday after the Feast of S. Faith was 12th October, or, (by the Roman Calendar) IV Id. Octob. Clearly, therefore, the correct date is Friday, 8th October, A.D. 1322, the year mentioned in line 14 of the parchment.

The word 'vicesims' has been omitted in the text by the writer. Some words were mis-spelt, and faults in grammar also occurred.

30th January, 1877.

JOHN A. C. VINCENT.

ON A NEW METHOD OF REPRESENTING BOTANIC SPECIMENS

BY EDWARD A. WILSON, F.R.S.

During a short pause in my favourite study of geology, I have been led to follow up a process connected with the kindred science of botany, the results of which I now beg to lay before you. It is a process not of strictly scientific research, but partaking more of a mechanical and semi-artistic character. The nature of it will be best explained by the specimens now submitted to you, some on paper, some on glass slides, the latter presently to be exhibited to you by means of the optical lantern, by our Curator, Mr. Cawthron. It is simply an improved process of nature printing, by means of which the results of that interesting process as known to us only in ponderous and costly volumes, are to be made available to the botanist in his everyday dealings with his favourite plants. By means of it, the outlines and venations of leaves, and of simple flowers such as heaths, can be produced with almost photographic fidelity, for the plant itself is used as model, while the colour is reproduced in oil, either in the natural colours of the plant, or in heightened and more artistic tints. Pending the possibility of photographing in colours, from which process we seem to be far removed as yet, it is an intermediate process between the scylla of the dust and dry bones of the herbarium, and the charybdis of the funereal rendering by the photographic process, and my specimens will be sufficient to point to the possibility of enabling the botanist, at the end of a successful day's ramble, or even within a day or two th-reafter, to obtain by an easy process the enduring image, in their natural colours, and with their fresh outlines preserved, of his favourite specimena.

THE FALMOUTH MUTINY OF 1810.**By ARTHUR HAMILTON NORWAY.**

The disturbances which occurred in the late summer and autumn of the year 1810, among the seamen serving on the packets on the Falmouth Station, are of interest from more than one point of view; not only as having provoked a feeling of irritation on the part of those responsible for the order of the service, which led immediately to the removal of the packets from Falmouth to Plymouth for some months, and in the end was possibly one among the causes which induced the government to place them under the more direct discipline of the Admiralty, but also as throwing light on the conditions of life among the sailors, at a time when the service was in its fullest vigour.

In August of the year named above, it was reported by the Post Office Agent at Falmouth, Mr. Christopher Saverland, that there was some uneasiness among the sailors then in port. The restlessness was confined at that time to the Lisbon packets, and was caused by an order which had recently been issued, prohibiting the practice of carrying out manufactured goods, to sell in Lisbon on commission; a practice which had hitherto formed a lucrative source of income to officers and crew alike.

It should be explained that this practice had grown up in defiance of the law. A statute of Charles II, which had never been repealed, distinctly forbade the packets to carry goods, except with the consent, expressly obtained, of the Commissioner of Customs. It had, however, been the custom from a very early date upon the Falmouth Station, to regard the Lisbon packets as excepted from this statute: and every sailor who took service upon one of these packets, looked forward confidently to making many times the amount of his wages, by the sale of goods on commission for the merchants of Bristol.

It was no doubt extremely advantageous in those days of war, for the merchants of the West of England to have at hand a means of conveying goods, which was at once so prompt, so

regular, and so secure, as was offered by the Lisbon packets. From the official point of view, however, the advantages of the system were not so great. It was urged with great force that the valuable goods carried on these packets, rendered them much more attractive to the enemy's privateers, than they would be if they were obliged to conform with the law; and at least one case was recorded at the General Post Office, in which it could scarcely be doubted that a packet had been lost from the effects of the private trade operating in another way. It is perhaps worth while to give the details of this case, which illustrates the magnitude of the irregular trade, which was now at last suspended.

The "Duke of York" packet was captured by a French privateer, on the 26th Sept., 1803, while on her homeward voyage from Lisbon, under command of her master, Mr. Henry Fenner. The packet was of 180 tons, the attacking vessel of 100 only. The privateer carried 65 men; the packet only 28; yet, as it was admitted by the officers of the "Duke of York," that they surrendered their ship without firing a shot, the Post-master General considered it advisable to have stringent enquiry made, and sent down the Inspector of Packets (Mr. Bennett) to Falmouth, for that purpose.

Mr. Bennett was unable to discover any very good reason for the fact that no resistance had been attempted by the packet men; but he discovered a circumstance which, as the privateermen might have said, "*lui donna furieusement à penser.*" This was, that the officers and crew of the "Duke of York" made a joint profit of £1,994 out of being captured by the enemy, and losing their ship, for which of course the country had to pay. This profit accrued from the fact that the merchants, to whom the goods belonged, ensured them fully against all risks before entrusting them to the packet men, and thus sought their indemnification from the underwriters. The packet men of course lost all that portion of the goods which they had been unable to sell at Lisbon, and which was still in the ship; but the price of the goods sold in Lisbon, was remitted by them in bills, which did not fall into the hands of their captors. Whether commercial morality would have required them to pay the

amounts so remitted to the underwriters or not, may be determined by those skilled in such matters. The fact is, that they retained them.

Two at least of the common sailors on board the "Duke of York" had £500 worth of goods to sell on commission, and one of these men profited by the capture to the extent of £300. The total value of the goods on board the packet, when she left England, was over £4,000.

These figures show that it was more profitable to be captured than to take a prize, as well as decidedly safer. It will be perceived, that the sudden cessation of the opportunity of having the good luck of the fortunately captured "Duke of York's" men, must have been felt by the sailors of the Lisbon packets as a serious grievance. It is probable that the hope of obtaining service upon one of these packets, was the chief motive which attracted sailors to the Post Office service, at Falmouth. The protection from the impress, which was the only other considerable advantage possessed by the packet men, was in force at all stations.

The cessation of the private trade was, however, not the only ground of complaint. As usually happens in such cases, the sailors from pondering over one grievance, speedily discovered that they had others. The rate of wages paid to them had been fixed some years before. Since its settlement, the prices of all commodities had steadily risen; and those wages, which at the beginning of the century seemed liberal, were in 1810 inadequate to support a family. The Lisbon men communicated this discovery to the crews of the other Falmouth packets, who welcomed it, and the disaffection spread rapidly.

There seems little doubt that the rate of wages was too low. The agent certainly was of that opinion: and he stated that the seamen urged their complaint with great moderation and propriety. They assembled in great numbers outside the Agent's office on the 15th August, and selected two men from the crew of each packet, whom they charged with the presentation of their memorial. This document contained a temperate statement of their case, and was in due course forwarded to London for consideration.

The Post Office took the not unnatural view, that the question of increasing the wages of the seamen was one for the consideration solely of the captains, who received a fixed yearly payment from the office, and might distribute it, within certain limits, as they pleased. There was, moreover, some intention of re-opening the question of the private trade, and of obtaining legal sanction for it, on the condition, that a certain portion of the profits should be appropriated by the department. Both these considerations led to some delay in dealing with the memorial.

On the 24th August, the seamen returned in a large body to the Agent's office, and enquired whether there was any answer to their memorial. On being told that none had been received, they dispersed quietly. Mr. Saverland, in reporting the matter to London, stated, that he did not apprehend any disturbance, but thought that if the position of the men was not in some way improved, many of them would leave the service.

It was finally resolved to obtain the material for a full comparison between the wages paid to the seamen serving on the packets, and those employed in the Navy and the Revenue service. With some care, the comparison was made; and it resulted, that the seamen on the packets were somewhat better paid than those in the navy. It did not of course follow from this that the wages were sufficient, but it could not be expected that a public department would pay more than the current rate of wages.

It was early in October when this conclusion was reached; and though it was of course not acceptable to the sailors, it seems possible that a contented feeling would have sprung up again. At this moment, however, the smouldering discontent was blown up into a fierce fire by the action of the customs officers.

The "Prince Adolphus," Capt. Boulderson, was announced to sail on Oct. 24th, for the Mediterranean; and at noon on that day, her crew was mustered, the mails and passengers were on board, and the packet was ready to slip from her moorings. The "Duke of Marlborough," Capt. Bull, was to sail in company with her for Lisbon. At the last moment, the customs officer

came on board ; and, not content with satisfying himself that no large quantity of goods was stored in either packet, he caused the sailors' chests to be broken open, and confiscated the little private ventures, which the men considered themselves entitled to retain. The crew of the " Prince Adolphus " at once refused to take the ship to sea ; and after trying in vain to induce them to return to their duty, Captain Boulderson made the signal for the Agent to come on board. Mr. Saverland lost no time in boarding the packet, and reasoned with the crew, pointing out that by refusing to obey orders they forfeited their claim to protection against the impress. He failed, however, to produce any effect ; and was returning on shore to consult with Captain Slade, the senior naval officer then at Falmouth, when he was hailed by Captain Bull. On pulling alongside the " Duke of Marlborough," Mr. Saverland learned that the customs officer was then on board that packet, acting with the same violence which had provoked the sailors on the " Prince Adolphus," and that Captain Bull feared the same results would follow. Mr. Saverland was, however, powerless to interfere, and returned on shore, where he held a consultation with Captain Slade. They were quickly joined by Captain Bull, who stated that his crew had, as he feared, refused to proceed to sea. He thought, however, that the personal influence of the Agent might have a good effect ; and it was noticed that the " Marlborough's " men did not return the cheers with which the crew of the " Prince Adolphus " announced what they probably considered a moral victory. Having arranged, therefore, that Capt. Slade should forthwith board the " Prince Adolphus," and impress the mutineers, Mr. Saverland returned to the " Duke of Marlborough," where he remained for two hours, using every kind of argument, but in vain. Capt. Bull therefore ordered the sails to be furled : and the mutinous seamen from his ship, also, were pressed. This was not done without some difficulty. Several of the older men resisted stoutly ; and one drew his knife on Capt. Slade, fortunately, however, without injuring him.

On the following morning, a very large number of seamen assembled in the courtyard, before the Agent's office, loudly demanding the release of the men who had been pressed, and asserting that they would not return to their duty until their

demand was complied with. It was unanimously resolved that no concessions could be made to the men while they remained mutinous, and the disturbance shortly became so great that the magistrates were sent for, and the Riot Act read. The seamen thereupon retired, cheering as they went; but the aspect of affairs was so threatening, that the garrison was got under arms, and Mr. Saverland thought it prudent to acquaint Sir Robert Calder, who was then in command at Plymouth, with the facts of the case.

On the following day there was no improvement. The sailors assembled on the bowling green, on an eminence, above the town. They had been joined by, practically, all the packet men who were in Falmouth at the time; and Mr. Saverland visiting each packet in succession, found only the officers and a few boys on board. The mutineers had now added to their demand for the release of the pressed men, a claim for additional pay. The next day, the public crier went round the streets of Flushing, calling on all packet men and lumpers (i.e. riggers) to assemble that evening at the "Seven Stars" tavern. The object of the meeting was to select two delegates, who were to proceed to London, and lay the complaints of the men before the Post-master General. Accordingly, two men, Richard Pascoe and John Parker, were chosen, and started by the mail coach for London on the morning of the 28th.

The naval officers, who were acting in concert with Mr. Saverland, were strongly of opinion that the mutiny was the work of a few men, and would collapse if the ringleaders could be secured. They determined, therefore, to surround the "Seven Stars," whilst the meeting was in progress; and with this view, a boat's crew entered Mylor creek, and was marched over the hill, down into the town of Flushing. The mutineers kept good watch, however,—if indeed the suspicion entertained by the naval officers, that there was bad faith on the part of some of the magistrates, acquainted with the scheme, was groundless,—and the attacking party found the tavern empty.

By this time, a certain friction was manifest between the mayor (Mr. Angove) and the magistrates of Falmouth, and the naval officers with whom the agent acted. Mr. Saverland

complained that the magistrates had shown no proper anxiety to secure the ringleaders; and there is little room for doubting, that not only the magistrates, but the whole town of Falmouth, sympathised with the seamen; and, if they did not openly help them, were yet unwilling to take side against them. On the morning of the 28th, Capt. Slade urged the mayor to call in military aid, and to forcibly enter the houses of the ringleaders, to secure their persons. At noon he left the mayor in the belief that both his proposals had been accepted, but the suggestion of search warrants was quietly dropped, and though a body of West Essex Militia were summoned, they did not enter the town till six o'clock, while at four o'clock the sailors marched in large parties, quite unmolested, into the open country.

In the meantime, two cutters, sent by Sir Robert Calder, had arrived in the harbour, and were placed under the command of Capt. Slade. The West Essex Militia were quartered in town, and a Sergeant's Guard was located in Flushing.

It is now necessary to return to the delegates, chosen by the seamen to represent their grievances at the General Post Office. Mr. Saverland had been careful to acquaint his chiefs with the fact of their departure, and had despatched an express for that purpose, which, outstripping the coach, reached London on the morning of the 29th October. A consultation was at once held, as to how Pascoe and Parker should be received. It seemed to the strict disciplinarians of that day impossible to countenance an act of mutiny, by parleying with these men. Whatever foundation of justice there might be in their complaints, it was essential that the sailors should return to their duty before any discussion could take place. It was therefore suggested to the Admiralty, that Pascoe and Parker should be impressed as soon as they arrived; and having obtained the necessary instructions to the Regulating Officer at the Tower, and had the warrant backed by the Lord Mayor, whose authority was required before the men could be pressed within the limits of the city, the chiefs of the General Post Office awaited the coming of the delegates with confidence. They arrived late on the afternoon of the 29th, and were ushered into the room, where the Secretary sat, expecting them, in company with the City Marshall. Their

explanations were out short; they were told they had no claim to be heard; and they were handed over, without more ado, to the City Marshall, who forthwith lodged them in the Poultry Compter.

It must be remembered, if this proceeding seems harsh, that Pascoe and Parker came to London as representatives of men who were in open, riotous mutiny, and whose conduct, by impeding the mails, was inflicting terrible loss on the mercantile community, and possibly even hampering the movements of the commanders of our troops and fleets, then engaged in active operations. Had these men come to London to present a memorial, temperately urged by persons who were at the same time performing their duty, they would have been very differently received.

It appears, moreover, that the delegates had not been discreetly chosen. Pascoe, who was known in Falmouth by the nickname of "Sir Francis Burdett" (it does not appear why), had served as steward of the "Prince William Henry" packet, and had afterwards been in the excise, whence he was discharged for "seditious and treasonable expressions." Parker was an American. There is no doubt that both men were noisy demagogues.

It had been the intention to bring the men up for examination at the Mansion House, on the 30th Oct., but on the morning of that day, it was discovered that the Lord Mayor had doubts about his powers of impressing, within the city, men whose offence, if any, had been committed at Falmouth. A remand was accordingly granted, in order that the matter might be re-considered.

By this time, the situation at Falmouth had materially changed. That firmness and zeal against the seamen, which no entreaties or arguments used by the naval officers could arouse in the mayor and magistrates, was inspired in a moment by a happy thought of Mr. Saverland's. He commenced to throw out hints of an important decision, which would be taken very shortly, if the mutiny did not subside, and which would be regretted by the town for many a day. The seed thus sown, sprang up in a few hours into a very promising crop of rumours

and reports. People went about with a very uncomfortable suspicion that something was about to happen; and Mr Saverland's office was besieged by persons, anxiously enquiring whether it was true that the government had decided to remove the packets to Plymouth. Mr. Saverland had received no hint of any such intention; but, seeing how great an effect the very suggestion had produced, he dilated on the extreme probability of such a step; and protested, that the conduct of the Falmouth seamen, and the almost avowed sympathy shewn them by the constituted authorities of the town, had brought him, and their chiefs also, to the extreme limit of their patience.

The situation thus created was, as the mayor immediately felt, too serious to be ignored. The loss of the packets would bring ruin on the town; and on the 30th Oct. a meeting of the burgesses was hastily convened, and the whole situation was discussed.

There is perhaps some room for doubt whether the naval officers and the agent, on whom the chief burden of responsibility fell, throughout these anxious days, did not overrate the extent to which the mayor and magistrates supported and encouraged the mutineers. It is certain, however, that on the very day on which the town's meeting was held, the aspect of affairs began to improve, and that evening Mr. Saverland was able to report to London, that some men were already returning to their duty. On the following day (the 31st Oct.) the upward tendency was more marked; and it was intimated to the Agent that the greater part of the men would return if they could be assured that they would be well received, and would not be abandoned to the press-gang. Mr. Saverland at once caused a notice to be printed and distributed, promising protection to all men who would return, except four or five, who were specially named, and who had distinguished themselves by particularly riotous conduct. This notice had a excellent effect, and on the evening of the day on which it was issued, there was a full muster of men on board all the packets.

The mischief was, however, done. The threatening aspect of the mutiny, and the impossibility of despatching the mails, had caused an amount of anxiety and alarm which was not to be allayed by the simple announcement that the men had returned

to their ships. It was felt necessary to mark the occasion in some signal way, and the idea of removing the packets to Plymouth, which had entered Mr. Saverland's mind on the 30th Oct., occurred quite independently to the Secretary of the Treasury on the same day. It thus happened, that the Secretary of the Post Office, on repairing to Whitehall on the 31st Oct., to suggest the adoption of this plan, found that it was already being favourably considered; and on the same day instructions were sent to Sir Robert Calder to despatch forthwith to Falmouth, a force sufficient to navigate the packets round to Plymouth.

The news fell like a thunderbolt on Falmouth. It was received on the 2nd November, and even Mr. Saverland was not prepared for it. The sailors had, as already stated, returned to their ships, and the step appeared so little necessary, that the agent thought that his chiefs in London must have failed to comprehend how much the situation had improved, and he consequently sent off an express, with a full report. The measure was, however, dictated by a strong feeling that it was necessary once for all to show the seamen and the inhabitants of Falmouth that they were not masters of the position. It was felt, not unjustly, that the danger and inconvenience of any interruption of the postal service, was great enough to warrant the department in giving a severe lesson; and the decision to remove the packets was consequently persisted in.

On the 6th November, H.M.S. "North Star," accompanied by a frigate and two sloops-of-war, entered Falmouth harbour, and set sail again for Plymouth, in company with six packets. On first reaching Plymouth, the packets lay in Hamoaze, while a temporary office was secured for the Agent and his staff at the "Fountain Inn."

It was not long before agent, officers, and men, wished themselves heartily back at Falmouth. Writing to the Secretary of the Post Office on the 13th Nov., Mr. Saverland says, "I hope the packets will not remain here, as a fixed station. If they do the establishment must be greatly increased, and the correspondence delayed. Both the West India and the American mails were ready yesterday, by about noon; but, what with the passengers in different and distant inns, the packets in different

places, the cartage of the mails, the purchasing of their anchors in very deep water, pilotage—not one man-of-war goes to sea without, so dangerous is the passage—that I see very clearly we shall not gain anything in getting to sea, though the mail arrives here in the morning.....In the late gale, the “Diana” parted her cable and was nearly on shore, and the “Stately,” a 74, nearly ran on board the “Despatch,” and would have sunk her if she had, but fortunately she ran on board a hulk, and just saved the packetIn Hamoaze and the Sound, the water is so deep, that if it blows a little the packets cannot weigh their anchors, and anchors are so distributed about by ships cutting and slipping their cables, that cables are worn out in a few hours. The “Elizabeth” cut a new cable, which cost £140, nearly through last night, getting foul of some anchor or wreck”.....Again, a few days after, he wrote. “The packets lie very badly here....Unless moorings are laid down, and a separate place assigned, some of them will be lost before the winter is over. The seamen are obliged to be victualled constantly on board, and stock of all kinds is dearer than at Falmouth, together with greater wear and tear, exclusive of risk.”....These representations were of course not without effect, and were pressed home by the fact, that on more than one occasion, packets which set sail from Plymouth in stormy weather, were obliged to run for Falmouth for shelter. The Post office, moreover, was exposed at this time to strong pressure, exerted by prominent persons in Cornwall, who used all their influence to secure the return of the packets to Falmouth.

At that time forty-four members were returned to the House of Commons by Cornwall; and it was rightly foreseen that these members would act unanimously in this matter. A deputation of the inhabitants of Falmouth had, moreover, reached London on the 8th or 9th November. It consisted of the Mayor, Mr. James Bully, Mr. John Carne, and Mr. Robert W. Fox. These gentlemen had an interview with the Secretary of the Post office on the 10th Nov., but received what was to them an unsatisfactory answer to their representations. The unyielding disposition shown to them, was due, not only to a conviction that it was much to soon to give way, but also to the difficulties arising from the case of Pascoe and Parker.

These two men were, at that time, in a high state of exultation. The consultations held upon their case had led to the conclusion that they could not legally be punished; and there was no alternative but to set them at liberty. It was not to be expected that, under the circumstances, they would let slip the opportunity of making capital out of their arrest, and they promptly commenced an action for false imprisonment against the Secretary of the Post office, laying the damages at the modest sum of £5,000 each. In order to obtain the funds necessary for the preliminary steps in this matter, they issued an appeal at Falmouth. It was headed, "to the friends and advocates of justice"; and described in feeling terms the sufferings endured by the delegates, "during their confinement of three days in a dreadful gaol, having nothing to make use of, not even straw to lie on." It does not appear what response this appeal met with.

The mayor and his companions passed many days in town, and at last returned to Cornwall without having obtained any pledge concerning the return of the packets to Falmouth. There was, in fact, a strong effort made at this time by persons interested in the port of Fowey, to persuade the Post Office that that harbour was better suited for a packet station than Falmouth. There was never any great prospect that this contention would prevail, but it deserved consideration, and it was thought desirable to have a full report upon Fowey made by a competent engineer.

That report when received was unfavourable, and by the end of the year there was no longer any doubt in the minds of the government, that no harbour existed which combined so many advantages for the purposes of a packet station, as Falmouth. It was not thought, however, that the town had been sufficiently punished; and it was not until the end of January, 1811, that the Treasury sanctioned the return of the packets. Long before that time, the action threatened by Pascoe and Parker had been dropped. Pressure was applied to them by the townspeople, who rightly judged that it was their interest to conciliate the Post Office, rather than fight it. The first result of this pressure is shewn in the following curious letter, addressed apparently to the attorney who had charge of the case:—

MR. ADREW YOUNG

Sir,

Having maturely considered our discourse this morning relative to the packets, and being ever anxious and desirous as far as lie in my power, and compatable with the true feelings of a man, to render every assistance to mankind in general, but more particularly to our Friends, Relatives, and the Inhabitants of Falmouth, have well weighed and thereby fixed unalterably (like the Laws of the Medes and Persians) the rule and criterion whereon and whereby we fix the Basis on which we make this Declaration; and offer terms, which when we consider the damages we have laid, namely Five Thousand Pounds each, are not nominal, but such as we have reason to expect will be allowed by Lord Ellinboro' and an Impartial Jury of our countrymen. By which means it will appear we are ready to sacrifice a large sum; and like Brutus and Manlius, altho' not offering up our children for a total sacrifice, offer up that patrimony they for the unhappy moments have suffered thro' their fathers and only friends being unlawfully detained in a dreadful goal, and which they are lawfully and justly entitled to.—But to return to the question, we are of opinion, and that not a vague one formed in a hasty moment, that the town of Falmouth is in a ruined state unless the packets return; and well knowing that the Inhabitants (those principal ones we mean) are deprived of their lucrative trade and great rents unless the packets can be restored to their former channel, and which we learn and anticipate cannot be done without our sacrificing our private feelings, which although difficult to do, we will do provided we receive the pecuniary satisfaction we demand, which is when considered a trivial sum, one thousand pounds each, now, Sir, far be it from us to beg or desire a settlement of the Business in this way, but for the good of the town, and we leave you to make, according to your judgement whatever use you think proper of this our Final determination.

RICHARD PASCOE,
JOHN PARKER.

Falmouth, Sunday, Nov. 25th, 1810.

This document breathes such an elevated spirit that it is painful to have to relate that the moderation of these two public spirited men did not serve them. The action was not compromised on these or any other terms; but was dropped unconditionally.

APPENDIX.

LIST OF CAPTAINS ON THE FALMOUTH STATION, 1793-1815.

NAME OF CAPTAIN.	NAME OF PACKET.	REMARKS.
Anthony		Serving in 1807.
Bell, Stephen	Francis Freeling	Transferred from Milford Station in 1803. Serving in 1813.
Blewitt	Duke of Montrose	Serving in 1813.
Blight, H.	Nocton, 1795, Halifax 1799	Died in 1810.
Boulderson	Jane, in 1795, after- wards Prince Adolphus	Appointed about 1759. Resigned in favour of his son in 1800.
Boulderson, John	Prince Adolphus	Appointed in 1800, on the resignation of his father. Retired 1813
Braithwaite		
Bull, James	Grantham	Appears to have entered the service in 1778. Resigned in favour of his son in 1802.
Bull, John	Grantham, & after- wards the Marl- borough	Appointed in 1802 on the resignation of his father.
Bullocke, John	Walsingham	Serving in 1814.
Caddy	Mary Ann	Serving in 1813.
Carter	Speedy (temporary)	Serving in 1815.
Causzar	Tartar	Appointed prior to 1793. Serving in 1795.
Clements	Active	Serving in 1796.
Cock	Townshend	Serving in 1813.
Cotesworth, Robert	Princess Royal in 1799	Appointed in 1799. Still serving in 1818.
Couse	Walsingham	Superannuated in 1799.
Cunningham, J.	Morgiana, Frae. Freeling	A Naval Officer. Appointed permanently to the Falmouth Station in 1814.
Dashwood		Left the service in 1795.
D'Auvergne		Transferred to Holyhead Station, whence he retired in 1799.
Deake	D. of Cumberland	Appointed prior to the war of 1793. Still serving in 1800.
Dennes, W.		Appointed in 1799.
Dillon	Sandwich, 1795 Lady Harriet 1799	Died in 1800.
Dodd	Marquis of Kildare Earl of Leicester	Serving in 1795 and in 1799.

Dyneley	Duke of Montrose	Killed in action, 1808.
Elphinstone, R.P.R.		Appointed 1811.
Fellowes, Wm. D.		Appointed 1799.
Forresdale, John	Princess Elizabeth	Serving in 1814.
Furze, John	Lapwing, 1814 Chesterfield, 1815	Serving after 1818.
Gibbon	Lady Louisa	Serving in 1818.
Gibbs		Serving in 1793.
Graham	Lady Mary Pelham	Serving in 1814.
Hale	Chesterfield	Serving in 1814.
Hamilton	Lord Hobart	Serving in 1808. Retired in 1812.
Hartney, John	Montagu	Serving in 1813 and in 1818.
James, William	Hinchinbrooke	Served in 1814 and in 1818.
Jones, R. Lea	Chesterfield, 1795 Harlequin, 1799	Died in 1803.
Kempthorne, W.	Antelope	Appointed prior to 1793. Died 1794. A Lieutenant R.N.
Kerr, John	Princess Charlotte 1799	
Kidd, John	Jane, 1799	A Master R.N. Appointed 1799.
Kirkness	Prince of Wales	Serving in 1808.
Lawrence, Edward	Duke of Kent, 1813	Appointed 1800. Serving in 1815.
Masterman	Snake (temporary)	Serving in 1815.
Moorsom	Princess Amelia	Killed in action,, 1812.
Mudge, John	Queen Charlotte	Master R.N. Appointed 1799. Drowned Jan., 1814.
Naylor	Nocton	Serving in 1811.
Niven, Chas. James		Appointed 1803. Died 1804.
Norway, John A.	Montagu	Commander R.N., killed while successfully defending his packet against the "Globe" American privateer, Nov. 2, 1813.
Petre, James		A Master R.N. Appointed 1800.
Pocock, Nicholas		Appointed 1804. Died about 1814.
Porteous, James	Magnet, in 1818	A Master R.N. Appointed 1799. Serving still in 1818.
Price, James	Sphinx	Serving in 1814 and 1818.
Proctor, Peter	Lady Wellington	Lieut. R.N. Appointed 1810.
Quick	Express	Serving in 1814.
Rattray		Serving in 1799.
Roberts	Daahwood	Serving in 1795.
Rogers	Portland, in 1795, afterwards West- moreland	Superannuated in 1799.
Schuyler, Adoniah	Prince Ernest, 1795, Auckland, 1799	Serving in 1795 and in 1818.
Santer, John		Appointed 1801. Transferred to Helvoetalsuys as agent, at peace of 1802.

Scott	Princess Elizabeth	Serving in 1818.
Servante	Roebuck, 1796	A Lieutenant R.N. Appointed in
	Penelope, 1799	1794. Died in 1801.
Sharpe	Prince Wm. Henry	Died 1803.
Skinner	Princess Royal	Appointed prior to 1793. Trans-
		ferred to Holyhead Station in
		1799.
Stanhope	Halifax	Retired in 1798.
Stephens		Died 1808.
Sutton, R. H.	Stanmer	Transferred from Harwich Station
		in 1803. Serving in 1818.
Taylor	Carteret	Died in 1800.
Thomson	Mary. in 1799	
Todd	Hanover, in 1795	
	Prince of Wales, in	
	1799	
Watkins, John	Montagu	Formerly master of the 'Montagu'
		Appointed to command her in
		1814, as a reward for gallantry
		in the action in which Captain
		Norway fell.
White	Princess Charlotte	Serving in 1814.
Wolfe	Westmorland	Died in 1799.
Yecombe, Edward	King George	Appointed prior to 1793. Killed
		in action 1803.

N.B.—This list is not put forward as being absolutely complete. It has been compiled for many sources, and is as accurate as the information at present in my possession enables me to make it.—A.H.N. 3rd Feb., 1891.

This List of the Post Office Packets is further continued in Thomas's History of Falmouth, to the year 1827.—A.M.J.

OUTLINE OF THE HISTORY OF FALMOUTH, AS A
PACKET STATION.

- 1688.—Packet station first established.
- 1696.—Packets sailed for the Groyne, (Corunna,)
- 1705.—Five Packets for West Indies.
- 1709.—Five Packets for Lisbon.
- 1755.—Two Packets for New York.
- 1756.—One Packet for Corunna.
One Packet for Gibraltar.
- 1763.—Four Packets now sailed for New York.
- 1764.—Packets were established to { Pensacola,
St. Augustine,
Savannah,
Charleston, U.S.
- 1776.—Six Packets now sailed for West Indies.
- 1778.—Five Packets for Charleston.
- 1782.—Four Packets for Lisbon.
Eighteen Packets (including Office Boats) now sailing
to West Indies and America.
- 1806.—Four Packets for Gibraltar and Malta.
- 1808.—Five Packets for Brazils.
Three Packets for Corunna.
- 1810.—Three Packets for Surinam.
The Station was removed after a meeting at Falmouth,
to Plymouth, where it remained for a period of some
months, but from the difficulties experienced in going
up Channel to so distant a port, Falmouth was again
adopted as the station.
- 1817.—The "Princess Mary" Packet, over-ran her Port, Falmouth,
and put into Plymouth, where she was wrecked 21st
January, with two Ships of War.
- 1823.—Up to this period the Packets sailed under Contract
between the General Post Office and the commander,
who received his appointment from that establishment

and engaged to provide, equip, and man a proper ship for the purpose, at a hire of £1,800 per Annum. These vessels were from 180 to 210 Tons Register. The shares in them were generally taken up in sixteenths by private individuals as a speculation, the owners receiving one third of the freights, and the profits arising from passengers being retained by the commander.

After this period, the above system of providing vessels for the service was changed, by their being placed under the orders of the Admiralty, instead of the Post Office; and as vessels were wanted they were supplied by Men-of-War, 10 Guns rated.

1827.—Thirty-nine packets were employed in this year. Five for Lisbon, the others taking their turn for various voyages, according to the time of their arrival home, eighteen being Post Office, and the remainder Admiralty Packets.

The Mails were made up in London, as follows:—

For Lisbon, every Tuesday.

For Mediterranean, 1st Tuesday in every month.

For Jamaica, }
For Carthage, } 1st Wednesday in every month.

For Leeward Islands, 3rd Wednesday in every month.

For Jamaica, }
For Vera Cruz, } 3rd Wednesday in every month.
For Tampico, }

For Buenos Ayres, 3rd Tuesday in every month.

Two clear days were allowed for the transmission of the mails from London to Falmouth; thus, if sent on Wednesday, they would arrive on Saturday.

1834.—Six Steamers were employed to convey the mails to

Vigo, }
Oporto, }
Lisbon, } Every Monday.
Gibraltar, }

Malta, }
Greece, } Every fortnight.
Ionian Islands, }

Egypt,
East Indies, } Every month.

1834.—Four Gun Brigs were employed on the American station.
Nine Gun Brigs were employed on Leeward Islands and Jamaica.

Six Gun Brigs were employed on the Mexican stations.

Five Gun Brigs were employed on the Brazilian and Buenos Ayres stations.

On the starting of the Royal West India Steam Company, these Gun Brigs for the West India Islands and Mexico were discharged. And on the joint petition of the Peninsular and Oriental Steam Packet Company, and the Royal West India Steam Company, supported by other interests, Southampton was shortly afterwards proposed as the Packet Port. This led to the abandonment of Falmouth as the general Packet Station. The Brazilian and River Plate Packets continued running to the last in Gun Brigs.

1835.—The Mails for Malta were conveyed by H.M.^s Steamers, several Sailing Packets therefrom being discontinued. These steamers also subsequently conveyed the Overland Mail for India via Alexandria.

1838.—The above, as well as the Lisbon Line, were supplanted by the Peninsular and Oriental Company contracting with the Admiralty to convey these mails. There were then employed six steamers, belonging to this company, to convey the mails to

Vigo,
Oporto,
Lisbon,
Cadiz and
Gibraltar, } Weekly.

taking mails for

Malta,
Greece and
Ionian Islands, } Every fortnight.

And for

Egypt and
East Indies, } Every month.

The remainder were all Men-of-War, Gun Brigs, so designated, although barque rigged.

4.—North American Station.

9.—West Indies.

6.—Mexican and Hayti.

5.—Madeira and Brazils.

the Post Office Packets having diminished rapidly, under the Admiralty's superintendence.

The next change was occasioned by Cunard's Line having contracted for conveying the N. American mails from Liverpool; and in

1841.—The West Indian and Mexican mails by the Royal West India Mail Company's Steamers, which however, were embarked and disembarked at Falmouth.

The only Packets remaining were those on the
Madeira and } Station.
Brazilian }

1850.—Falmouth ceased altogether to be a Packet Station.

PRINCIPAL LANDOWNERS IN CORNWALL, *temp.* KING JOHN.

By WILLIAM SINCOCK.

Before we endeavour to get a clear view, through the mists of nearly seven centuries, of the men who then composed the gentry of the county, it will be useful to compare the information afforded by the two scutage-rolls with each other.

Robert de Cardinan, by far the greatest landholder, is, in both of these, stated to hold 71 knights' fees. These appear to have been the same which were held by Robert Fitz-William, in 1165; and it is evident from this, and other circumstances, that he married the heiress of Fitz-William. In the *Liber Niger*, Fitz-William is said to hold 20 of his knights' fees under Walter Hay. In the scutage-roll (A), Walter Hay is said to hold 20 knights' fees in right of Agnes, his wife. Reginald de Valletort, in Roll A, is stated to hold 51 fees; in Roll B they have increased to 59. Half of the fees which had belonged to Richard de Lucy are said to have been held, 8th Richard I, by Geoffrey de Lacell (probably Lucy). Robert Fitz-Walter is stated, in Roll B, to have been possessed of 11 knights' fees, which had belonged to his uncle, Richard de Lusti (Lucy). Nine other knights' fees of the same fee, are said, in the same roll, to have been held by Robert Peverel. In Roll A, Nicholas Fitz-Geoffrey is said to have held 10 knights' fees, being, no doubt, son of Geoffrey Fitz-Baldwin, who held the same number in 1165; and it seems to have been the same property which, according to Roll B, was held by Thomas de Middleton *de honore de Middleton*. These fees, we believe, eventually became the property of the Grenville family by marriage with the heiress of Middleton. William de Botreaux continued to hold 12 knights' fees in the reign of Richard I as his ancestors had done in that of Henry II. Robert de Tintagel in Roll B holds 5 knights' fees, which were held in Roll A by Gervas Fitz-William, his father. William Fitz-Richard in Roll A holds 5 fees, but in Roll B Richard Fitz-Richard holds only 1 fee and a third with the heir of William de la Roche. William de

Albemarle in Roll B holds 5 knights' fees in right of his wife, the relict of Robert de Bikehat. Alan Bloyou, in Roll A holds 7 knight's fees, and in Roll B Ralph Bloyou is stated to hold the same number. Stephen Flandrensis, in Roll A held also 7 fees, which in Roll B were held by Archemaund Flandrensis (Fleming). William, Earl Reginald's brother, when the entry respecting him on Roll A was made, continued to hold the same 4 knights' fees which he held in 1165; and Henry Fitz-William, probably his son, held the same number in Roll B. In Roll A Alan de Dunstanville is stated to hold 1 knight's fee, which in Roll B is held by Walter de Dunstanville. In the latter roll, we find, for the first time, the name of Henry de Pomeroy, but the number of knights' fees which he held is not specified. In the 40th of Henry III (1255) this family was returned among the first class of land-holders, and they continued to possess considerable landed property in Cornwall for several generations, their chief seat being at Tregony. This Henry de Pomeroy, the younger, was son of that Henry who, in the reign of Richard I took possession of St. Michael's Mount by stratagem. In the year 1204, he gave 60 marks to be restored to certain possessions of his father's, which he had before entering the castle on St. Michael's Mount.

The Honor of Middleton.

The Manor of *Mideltons* was held, in the reign of Edward the Confessor, by Alwin, and afterwards, before 1083, by Hamelin, under the Earl. The site of this manor is supposed to have been at a place now called Milton, in Morwinstow, where was a chapel dedicated to S. Mary, which was licensed by Bishop Stafford on March 20, 1408.

This Manor of Middleton was probably a Tithing, for as early as the first year of Richard I (1189) we find, in the Great Roll of the Pipe, that the *men* of Middleton were returned under the account for Tallage, as owing twenty-two shillings and four pence *de Dono*.

In the Chancery Roll of the 3rd John (1202) Richardus Flandrensis, then the *vice-comes* or sheriff, rendered an account of twenty marks received from Nicholas de Middleton for 10 knights' fees of the honor of Moreton; and in the same roll,

the sheriff acknowledges the receipt of twelve marks from Robert de Bikeleia for 5 knights' fees of the same honor. The total amount accounted for by Flandrensis for the farm of the County of Cornwall was £232 4s. 1d.

The extent of Cornish acres, in 12 Edward I (1284) gives Middeland as containing 68 acres, and it was then the largest manor in the Hundred of Stratton, the entire acreage of which was set down as 341½ Cornish acres. It is styled "*Decana de Middeland*," and as the Hundreds were presided over by their *decanus*, head-borough, or hundred-man, this honor was probably the privilege of this head-manor. The change of name from Middleton to Middeland seems to have been then made. In the Inq. p.m. of Edmund, Earl of Cornwall, which was held in 1300, *Middellande* is reckoned as 10 fees. In 5 Edward II (1332) the Inq. p.m. of Patricius de Cadurcis, (Chatworth) finds that he died possessed of 10 fees in *Middellonde*.

Lyson's says of Middleton that "these 10 fees were granted to William Briwere, by King John, in 1203, and this property, of course, we trace no farther." We find, however, as above stated, that Patrick Chaworth held it, temp. Edward II. William Briwere, that great feudal lord in the time of King John, died in 1226, and was buried before the high altar, in the abbey of Dunkeswell, Devon, of which he was the founder. His second daughter and co-heir, Margaret, was wife of — De la Ferté, and their heir, William de la Ferté had a daughter and heir, named Gundred, married to Pain de Chaworth, whose grandson, Patrick, died in 1332, the last male of the great feudal branch of the family of Chaworth.

Dugdale, in his Barony of England, says that "in 5 John William Briwere procured from the king those 10 fees in Cornwall, which Nicholas de Middleton formerly held, with the marriage of the heirs of the said Nicholas." This statement differs from the grant mentioned by Lyson's; William Briwere, then sheriff of Cornwall, having procured from the king, the wardship and marriage of the heirs of the deceased Nicholas de Middleton.

In 1380, Fitz-Walter held Midland manor and franchise. The feodary (1346) under Stratton hundred, says Herbert de Pyn holds 3 fees in Middeland.

Roger Anglious was son of Ralph de Oherdsey, and a charter of his occurs in the register of the Abbey of Nutley in Buckinghamshire, *circa* 1204. Among the witnesses to this charter was Gerard, son of Robert de Greinville, ancestor to the Dukes of Buckingham and Chandos. The Abbey of Nutley was founded *anno* 1161, by Walter Giffard, second Earl of Buckingham and Longueville, who died without issue, in 1164. His sister, Constantia, or Constance, is said to have been the wife of Richard de Greinville, ancestor to the Earls of Bath, &c., and their grandson is supposed to have married the heiress of Thomas Fitz-Nicholas de Middleton, and to have died *circa* 1217. (Vide No. 3).

The *Honor of Middleton*, Lyson's says, "was granted by King John to William Briwere in 1203, and that this property, of course, we trace no further." From extracts accompanying this paper, it appears that in 1332, the 10 fees of Middellande or Middleton, where held by the Chaworth family, who, through the heiress of De la Ferté, descended from William de Briwere, who died 1226.

SCUTAGE-ROLL (B), 1212-20.

CORNUBIA.

1. *Robert de Cardinan*.—71 knights' fees.

The same as in Roll A. Robert was living 1216.

2. *Reginald de Valletort*.—59 knights' fees of the Honor of Trematon.

In 1165, Ralph de Valletort held 59 knights' fees in Devon and Cornwall. In 1196, Reginald held 51 fees; and in 1213, he is returned as holding the same number as were held by Ralph. The manor, honor, and castle of Trematon, the *Tremeton* of Domesday, were held by Brismar in the reign of the Confessor, and by Rainald de Valletort, under the Earl of Moriton and Cornwall, temp. William I. In 1275, 4th Edward I, Roger de Valletort, the last of the family of that name, resigned his right and interest in the manor and castle, with the appurtenances, to Richard, Earl of Cornwall.

3. *Thomas de Middleton*.—10 knights' fees of the Honor of Middleton.

This seems to have been the same property which was held in 1165 by Geoffrey Fitz-Baldwin, and in 1196 by Nicholas Fitz-Geoffrey. The heiress of Thomas Fitz-Nicholas de Middleton is supposed to have been married to Sir Richard de Grenvill who died about 1217. The name of Grenvile first occurs in Cornish records 40 Henry III (1256), and Richard de Grenvile then appears as the largest landholder, being returned as holding 50 librates of land.

4. *William de Botterill*.—12 knights' fees.

This is, probably, William (III) de Botreaux, whose father was sheriff of Cornwall 1206-8, and died in 1211. It was not, however, until 1220, that he obtained livery of his lands, and he died in 1243, *sine prole*, when Reginald, his brother, succeeded him.

5. *Richard Fitz-Walter*.—11 knights' fees of the fees of Richard de Lusti (Lucy) his uncle, (or grandfather) (*avunculus*).

At the death of Geoffrey de Lucy, Bishop of Winchester, on 4th September, 1204, his nephew, Robert Fitz-Walter, had livery of his lands. Richard de Lucy was a Chief Justice of England from 1154 to 1179; by his wife, Rohais — he had issue—Geoffrey, Maude, and Rohais. Geoffrey was Bishop of Winton. Maude's first husband, Walter Fitz-Robert, had with her the lordship of Disce, in Norfolk. He died in 1198, leaving a son, the above-named Robert Fitz-Walter. This eminent feudal baron after the battle of Lincoln, went to the Holy Land, and assisted at the great siege of Damietta, where he died in 1234.

6. *Robert de Peverel*.—9 knights' fees of the same fee (*i.e.* of the fee of Richard de Lucy).

Lysons remarks—that R Peverel held these fees as a trustee for Rohesia de Lucy, the other daughter and co-heiress of Richard de Lucy; assigning as a ground for this supposition, that one of the co-heiresses of Pain Peverel of Cambridgeshire, was the mother of Rohesia's husband, Fulbert de Dover.

Pain, or Pagan Peverel, had a great fief in Cambridgeshire by grant of Henry I. He was founder of Barnwell

Priory. Matilda, one of the 4 co-heiresses, was wife of Hugh de Dover, of Chilham. This Matilda, or Maude, had an only brother, William Peverel, who died in Palestine, *circa* 1147-8, *sine prole*, and was succeeded by his sisters.

Rohesia de Lucy's first husband, Fulbert de Dover, was Lord of Chilham, in Kent. In the 9th King John, she had livery of lands on paying a fine to the crown.

Although no proof of a trusteeship exists, there can be no doubt that the families of Peverel and De Lucy were connected in some way.

As an instance of the difficulties which the genealogist has to encounter in his researches with regard to families in the 12th and 13th centuries, it may be briefly stated how contradictory are the accounts of the connexions of the great Richard de Lucy as given by the best authorities.

Dugdale says—that Richard de Lucy, by his wife, Rohaise, had *two* sons and two daughters. Francis Thynne, however, according to Weever, says he had only *one* son, Godfrey, afterwards Bishop of Winton, and three daughters—1. *Maud*, wife of Walter Fitz-Robert; 2. *Aveline*, wife of Richard Rivers, Lord of Stanford Rivers, Essex; 3. *Rose*, wife of Richard, natural son of King John.

Burke, in his "Extinct Peerage," says—Richard de Lucie had two sons and two daughters, thus copying Dugdale.

- I. Geffery, who died in his father's life-time, leaving Richard, his son and heir, who died *sine prole*, before 1196, when the inheritance devolved upon his aunt, Rohais.
- II. Hubert, who had the lordship of Stanford, in Essex, and hundreds of Angre, for his livelihood, but died *sine prole*.
- I. Maude, married first to Walter Fitz-Robert; and secondly to Richard de Ripariis, and died 27th Henry III, 1243, leaving issue.
- II. Rohais, married first to Fulbert de Dovor, Lord of Chilham; and secondly Richard de Chilman. This Rohais, upon the decease of her nephew, succeeded to the estates of her elder brother, and upon the death of her younger brother, Hubert, she had livery of the whole barony.

Banks, in his "Extinct Baronage of England," thus writes of *Maud*, who is said to have remarried Richard de Ripariis, and died in 1242-3, which, if the fact, she must have lived to a great age, this period being 63 years after her father's death; he died in 1179. *Rohais*, Dugdale makes to be daughter of Richard de Lucie; but in his account of the family of Dovor, he affirms her to be daughter of Geffery, son of the said Richard, the chief justice.

Banks says of Hugh Dovor, that he married Maud, one of the daughters and co-heiresses of Pain Peverel of Brunne, in Cambridgeshire, which Maud died *sine prole*.

This Hugh was succeeded by Fulbert de Dovor, who married Roese, daughter of Geffery, son of Richard de Lucy, and had issue:—

Robert who died *circa* 1203, leaving Roese, his daughter and heir, who married first Richard, son of King John (afterwards Earl of Cornwall), but this marriage being before she came of age, she dissented thereto, and married secondly Richard, son of Roger de Chilham, called also Richard de Dovor. On the decease of Richard de Chilham, the said Roese married thirdly Richard, a natural son of King John, commonly called Richard le Fitz-Roy, by whom she had two daughters: 1, Lora, who married William Marmion, of Polesworth, Warwickshire. 2, Isabel, married to David de Strathbolgie, Earl of Athol.

Having now exhausted the enquiry into the descendants of Richard de Lucy, it is very unlikely that Robert Peverel, as Lysons supposed, held these 9 fees as trustee for Rohesia, daughter of Richard de Lucy, who in the 9th King John had livery of lands, since the earliest date we can assign to this Roll is 14th John, five years after Rohesia had paid a fine to the crown.

Robert Peverel was probably son of William Peverel, who *circa* 1170, was Lord of Hamatethy, and gave the church of S. Breward to the priory of Tywardreth. (Refer to the Priors of Tywardreth in the 12th century. Journal No. xxxiv, Vol. 9, 1888).

7. *Richard Fitz-Richard*.—1 fee and a third part with the heir of *William Rupe* (de la Roche).

In Roll A, Ralph de la Roche held 3 knights' fees, which now appear divided between Richard Fitz-Richard and William de la Roche's heir. The Fitz-Richard's were ancestors of the family of Fitz-William of Bodinneck, in Lanteglos, near Fowey, who became extinct in the male line in the reign of Edward III. In a deed of the year 1259, among the Arundell papers, Tremoderet, in the parish of Roche, was a manor belonging to the family of De la Roche.

8. *Ralph Bloyou*.—7 knights' fees.

These 7 fees, held by Gralanus (Alan) in 1165, and by Alan Blund (Bloyou) in 1196 (Roll A), are now in the name of Ralph Bloyou. In the Roll of Seizin of Launceston castle, *Ralph Bloye* holds of the honor of the castle (1337). Alan, who held in 1196, died in 1204. His son, Henry, having died s.p. in 1210, was succeeded by his brother Ralph as above. This family became extinct in the 14th century: the co-heiresses were Elizabeth, who married first Sir Stephen de Tinten, by whom she had a daughter, Alice, who became the wife of Sir Walter Carminow; and secondly Ralph Beaupre, *alias* Bello Prato. The other co-heiress was Johanna, whose husband's name is unknown, but she had a daughter Margery, who was mother of Simon Berkle, who espoused Margery, daughter of Sir Oliver Carminow. The family of Bloyou, for many descents, was of considerable importance in Cornwall, and they held the Manors of Trefreake in St. Endellion, Deliomure in St. Teath, and other lands. The last of the name, Sir Ralph Bloyou, married Margaret Botreaux, and died *sine prole*. His sisters became his co-heirs.

9. *Archemaund Flandrensis*.—7 knights' fees.

In 1196, Stephen Flandrensis held the same number of fees as Archemaund now holds. In the "Extinct Peerage," Stephen, second Baron of Slane, died 14th John, and was succeeded by his son Baldwyn le Fleming. It is noticeable, however, that the first mention of this Baldwyn does not occur till 29 years after his father's death. In Testa de Nevill, 19 Henry III, Archenbald le Fleming is returned as holding 7 small fees under

Reginald de Valle Torta, in Cornwall and Devon. By the Inq. p.m. of Edmund, Earl of Cornwall, these fees are found to be made up of Breton, Hautebray, and Bray Manors, the last being in Cornwall. The next mention of this family in Cornish records occurs in 40th Henry III, when Marc le Flamanc is one of 13 persons who held in the county 15 librates of land or more by military service, and were not knights. Marc held 16 librates.

10. *Robert de Tintagel.—5 knights' fees.*

In 1196, Gervas, son of William, *alias* Gervas de Hornicote, held these 5 fees. In 1207, he died, when Robert de Tintaioel (Tintagel) gave forty marks to have the whole of the inheritance which belonged to his father, Gervas de Hornicote. In 1220, the Sheriff of Cornwall, William Lunet, was commanded to resume into the King's hands all the lands which Henry Fitz-Count had given out of the King's demesnes to his knights and servitors during the time he held the County of Cornwall, *except the lands which belonged to Robert de Tintagel.* (Rot. Fin. 5th Henry III). Robert de Tintaioel died before 31st March, 1224. His granddaughter, Sara de Hornicote married Sir Roger de Carminow, and thereby added largely to the fortunes of the family of Carminow.

11. *Henry Fitz-William.—4 knights' fees.*

In 1196, William, brother of the Earl, held the same number as Henry the son of William now holds.

12. *William de Albemarle.—5 knights' fees with the relict of Robert de Bikehat.* (Robert de Bikeleia).

William de Albemarle possessed his estate in right of his wife, the relict of Robert de Bikehat. Bikeleia, in Rot. Cancel. 3rd John, held 5 knights' fees. This William was, probably, a cadet of the Earls of Albemarle, who were connected with the Mandevilles, Earls of Essex, and we find that at this time Robert de Mandeville held 1 knight's fee in Cornwall. Henry d' Abemar (Albemarle) was one of the witnesses to Cardinan's charter to Lostwithiel, *circa* 1196; and Henry de Albemara tested a charter to the Priory of Tywardreth, in 1235.

13. *Ralph de Trear*.—1 knight's fee.

This we take to be Treator, near Padstow. Jane, daughter of Sir Roger Arundell, of Calwodly, Devon, brought Treator with other lands to the family of Peter, who made Treator their residence for about 200 years.

14. *Richard Wallensis*.—2 knights' fees.

In 1208, the manors of Meredin and Wininton (Merthen, in Constantine, and Wynington, in Gunwalloe), were held by Cadwalanus *Wallensis*, who died in 1211, when his lands were taken into the king's hands. They were afterwards granted by King Henry III to his brother, Richard, Earl of Cornwall, who, being desirous of recovering Tintagel which had been alienated from the Earldom by Henry Fitz-Count in 1215, gave them, together with the Manor of Tamarton to Gervas de Hornicote, *alias* Tintajuel, in exchange for the Manor of Bochyng (Tintagel) and this manor still continues part of the Duchy lands.

15. *William de Bosco-Roardi*.—2 knights' fees.

We find in the Wives-Roll, 1066, the names of Roger de Bosco-Roard and Guillaume de Bosco-Roard, among those at the battle of Senlac. This family held in Hemmestone, in Devon, of Launceston Castle, and in 1337, William of Rowardswood was returned as so holding.

16. *John de Monte-Acuti*.

The Manor or Honor of Lantyan, in St. Sampson's parish, was among the ancient possessions of the Montacutes, who were Barons, by writ of summons, in 1300, and subsequently Earls of Salisbury. The number of the fees held by John de Monte-Acuti or Montacute, is not stated in the copy of this roll given by Carew.

17. *Henry de Pomeray*.—Number of fees wanting, probably illegible.

In 1165, Henry de Pomerai held 4 fees, and about 40 years after the date of this roll, the family of Pomeroy was among the first class of land-holders in the county of Cornwall. In 1337, the family held of Launceston Castle, in Tregony.

18. *Henry de Herys*.—1 knight's fee.

In Ped. Fin. 4 King John, Cornub. Inter Richard de Trecarl qu. Henry Heriz def. in Ebbeford, &c. This is an early notice of an ancestor of the now extinct family of Erisey, of Grade, of which the Earl of Kimberley is the present representative.

19. *Pharamus Warebras*.—1 knight's fee.

In Testa de Nevill, among the free tenants of the Bishop of Exeter in Cornwall, we find the heirs of Pharao de Walesbren, which Pharamus de Walesbraus in 1196 held half a knight's fee in Tregaradoc (in St. Teath), and he suffered a fine therein and in 24 marks of chattels to Guy de Wautam, who had married Beatrice, the daughter of the said Pharamus. Ped. fin. 8th Richard I.

20. *Barth. fil.*.—1 knight's fee.

This obscure entry we venture to explain as follows:—Bartholomew Toret held 1 fee in Streton (Stratton). He was dead before 1235. A Blanchminster married Lucia Toret, and she was defunct in 1254. Ranulph de Albo Monasterio (Blanchminster) in 1337, held the same fee in Stratton of Launceston Castle, which was formerly held by "*Bartholomew the son of Turook*."

Toret in 1060, was the Saxon Lord of Wroxeter and Eaton (Mascott) in Salop. His grandson, Peter Fitz-Toret, married Lucia Haget, and by her had a son, Bartholomew Toret, whose name occurs in 1196-1229, and a daughter, Lucia, who married *** de Albo Monasterio.

The name of Peter Fitz-Toret is constantly occurring in connection with Shropshire places, or Shropshire men, but, in far the greater number of instances, this Peter appears as a follower, a witness to very many deeds of, or as a Knight of Walter de Dunstanville (I) 1156-1195, Lord of the great manor of Idsall. But it is more than probable that he was Dunstanville's tenant at Hem and Hinnington, and perhaps elsewhere. These hamlets were held by Toret under the Manor of Idsall, which manor had been probably acquired by Alan de Dunstanville (I) by favour of King Henry I before 1135. This feudal connection with Walter de Dunstanville, perhaps introduced Bartholomew de Toret to the distant county of Cornwall,

in which he held one small fee in Stretton. He was dead in 1235, and his sister, Lucia de Albo Monasterio, who was dead in 1254, having had a son, Ranulph, who was probably the ancestor of Reginald de Albo Monasterio (occurs 1284, and Richardus de Albo Monasterio, who, in 1278, presented *Richardus de Grampis ad Ecclesiam de Wyt, in Cornubiâ*. Alice, the heiress of the Blanchminsters of Binsary Castle, Stratton, married Sir Richard Hirvis before 1375.

21. *Gilbert Anglicus*.—1 knight's fee.

This Gilbert succeeded Roger Anglicus, who held the same fee in 1196. John the Englishman, in 1337, held in Warlenast, (now Wadfast, in Whitstone. (* see note 116).

22. *Simon Pincerna*.—1 knight's fee.

In 7th Richard I (1196), Richard Reuel, then sheriff of Cornwall, accounted for £10 2s. 6d. which he had received for $\frac{1}{3}$ th of a year from Simon Pincerna (the butler) for lands given him by the King in Lanhoe (St. Kew). Simon was dead in 1213; his son, Simon (son of Simon le Butiller) having succeeded him. In 1337, Simon de Pyncerna held in Liskeard, and Henry de Pyncerna in Rillaton, a manor in the parish of Linkinhorne. The heiress of Pincerna, afterwards bearing the names of Conarton and Lanherne, married Arundell in the reign of Edward I (1272-1307).

23. *Richard, son of Juc*.—1 knight's fee.

In 1196, Richard held only half a fee. He now in 1213, holds 1 fee.

24. *Richard Bamon*.—1 knight's fee.

Temp. King John, there was at Yarbiry, county of Devon, and at Norton-bawceyn, a family whose name was variously written as Bauzan, Bauzein, &c. Sir Richard Bawceyn, of Norton-bawzeyn married Ellen, daughter and heir of John de Shilveston, 1199-1216. (Prince's Worthies of Devon).

In the early part of the 13th century, John de Silveston was Lord of Penvrane, in St. Pinnock, and of the advowson of the church of St. Pinnock thereto appurtenant. Shilveston, now Shilston, is in the parish of Modbury, and was acquired by Sir

Richard Bawceyn on his marriage with Ellen de Shilveston. John de Silveston had a son, Serlo de Penvrane, so called from the manor of Penvrane which belonged to the Silveston family before 1226.

25. *Henry, son of the Earl.*—1 knight's fee.

Henry Fitz-Count, *circa* 4th John (1203) gave 1,200 marks for the lands of William de Traci; which lands Hugh de Courtenai and Henry de Traci afterwards enjoyed. He was an illegitimate son of Reginald, Earl of Cornwall. In 1337, Henry Fitz-Count held in Liskeard — old fees recited in Roll of Seizin of Launceston Castle.

26. *Hward de Bekeloge.*—1 knight's fee.

Among the knights' fees held of the honor of Launceston Castle, in 11th Edward III, John Lercedekne held in Truro (or Treverye) and Hollewald (in Davidstow), *which Hward in Bykkelake formerly held.*

27. *Walter de Dunstanvill.*—1 knight's fee.

In 1196, Alan de Dunstanvill held. He is now succeeded by his nephew, Walter, who married Petronilla, daughter of William Fitz-Alan (II), Walter died *circa* August, 1241. In 1337, William De Basset holds in Tehidy and Trevalga, which Walter de Dunstanville held.

28. *Hastul de Sullinge* —one-fourth of a knight's fee.

In 1196, John de Soleigney is mentioned. His son, *Hastul* or *Hasculfus* now succeeds. On Looe Island was the cell of S. Michael de Lammana, founded for two monks. It was granted to the Abbey of Glastonbury before 1144. The grant was confirmed by Hastutus or Hasculphus, son of John de Solennio. Henry Boscawen married Nicholas de Sulyn. 1st Edward III.

29. *Robert de Mandouil.*—1 knight's fee.

Probably a descendant of Roger de Mandeville who, in 1165, held 4 knights' fees.

30. *Alice de Valletort.*—1 knight's fee.

See No. 2 for Valletort family.

This name concludes the list of holders of knights' fees in this Scutage Roll. We now have 5 persons designated "*Seriantes*," or these holding by Grand Serjeanties.

1. *Peter, son of Oger*, who holds in Cabulion forty acres, by the service of one cape or cloak of grey serge or cloth on the coming of the lord king into Cornwall.

In 1324, Walter, son of Adam de St. Margaret, died. It appears from his inquisition post mortem that he was seized in demesne as of a fee of land in the hamlet of Cabilia which he held *in capite* as of the honor of Launceston, in socage, rendering one *capam de grisanto* so often as the King should cross Poulston Bridge into Cornwall, which cape was to be of the value of 16^d.

2. *Roger, the harper or minstrel*, holds five acres by the tenure of carrying the aforesaid cape after the king while he remained in Cornwall.

3. *John de Pennoit* holds one acre in Lametton (Lametyng) *pro, de 5^a*, of the value of 5/- by the tenure of keeping watch over the king whilst there (in Cornwall). Penquit in Sampsons.

4. *Roger de Bodmel*, 1 acre *pro sequela in Com.*

Roger de Bodiniel, of a family deriving its name from the Manor of Bodiniel, in Bodmin; temp. Edward III, a Roger Bodynyel was one of the most wealthy men in Bodmin.

5. *Robert Epiakelin*, holds 2 acres, "*et furuum*" in Launceston, that he may go *in exercitum* with the king at the charge of the king.

In Testa de Nevill, *Robert Esprakelin* holds "**** solid' terre per Serjantias*," p. 203; and again, in p. 204, *Robert Escapelin* occurs. Beyond this notice, the name is not traceable in any record relating to Cornwall that we have had an opportunity of seeing.

In Blount's Feudal Tenures, under the chapter on Grand Serjeanties, these holdings are mentioned, and instead of the ordinary rendering of 40 and 5, held by *Peter fil. Ogeri* and *Roger Citharedus* respectively, being 40 *shillings* and 5 *shillings*, they are given as so many *acres*, which appears to us the more reasonable translation.

Lysons says of the manor of Pengelly in St. Neot, that "it was held, in the reign of James I, by the service of providing a grey cloak for the Duke, whenever he should come into Cornwall, and delivering it to the lord of the manor of Cabilia,

whose office it was to attend the Duke with it during his stay in Cornwall. A more ancient record, as printed in Blount's Tenures, assigns the service of *providing* the cloak to the lord of Cabilia, and that of *carrying* it to the lord of Pengelly."

Pengelle was held in the Confessor's time by *Ednoth*, and he continued to hold the same manor, under the Earl, in 1086. It is probable that *Roger Citharedus* was lord of Pengelly in the reign of King John, and that he held the office of harper or minstrel in the royal court.

Sir John Maclean, in a note on the family of St. Margaret, says:—"It appears from the Red Book of the Exchequer, fo. 143: *Petrus fil' Ogeri* 40^a *in Cabulion per unam Capam de Gressenge in aduentu d'ni Regis in Cornubiam. Rogerus Cithared' 5^a pro portanda illa capa dum Rex fuerit in Cornubia.*

THE INDIAN BUTTERFLIES IN THE TRURO MUSEUM.

By HENRY CROWTHER, Curator of the Royal Institution of Cornwall.

One of the most pleasing duties which the Curator of a Museum has, is the keeping green of the memories of the donors to the Institution under his charge. Such a task is mine to day.

Anyone taking up the Journals of the Royal Institution of Cornwall from 1844 to 1850, cannot fail to be struck with the many and valuable gifts of General Jenkins, of Assam, so numerous indeed that, that gentleman may be considered as the largest benefactor the Society has known to its Museum. The objects he gave were of high value, and rare. Broadly, they fall under three classes—skulls, birds, and butterflies; not of the value of the skulls, nor of the variety of many of the birds, do I intend to speak to day, but of the butterflies I am wiahful to say something, as in the course of next year they will become, in all probability, a centre of attraction in our Museum.

We are favoured by having in Truro, dwelling in our midst for a short time, the Rev. W. A. Hamilton, a collector and specialist of the same kinds of butterflies which General Jenkins sent to this Institution in 1844, 1846, 1847, and 1848, and we have to thank this gentleman for his kindness, in naming the Indian butterflies in the Museum for us. If these butterflies had been described when they were sent, instead of resting unnoticed in our cases for a period of nearly half a century, the Museum of this Institution would have been fortunate in possessing many of the original types of Indian butterflies, as one-third of them have been described as new to science since they were sent here by General Jenkins. One is convinced in looking through the collection that the rarity of some were known to the donor, for in many cases they are named generically, and the words *nov. sp.* added; in other cases marked *nov. sp.* simply; the pity is the donor did not give them some specific name, knowing them to be new species, and gain the credit due to himself. It is too late in the day to recover this honour for General Jenkins, but as a Society, we can issue a list of the names of the butter-

flies collected by him, giving the dates when they were first described as new to science by different lepidopterists, and shew by the date of deposition with us their claim to priority. This I think is due to his memory, and is our duty.

Such a list, with an added plate of the descriptive parts of a butterfly, a scientific diagnosis of each family and sub-family, notes on the generic and specific habits together with the localities, so far as we can learn, where General Jenkins collected them, would make a delightful guide-book to one part of our Museum. For, popularly, a collection of British butterflies is a strong attraction in a Museum, and an Indian collection is much more so. It has been well said that India is the land of butterflies; the warm valleys especially swarm with butterfly and other insect forms, their beauty dazzles us, and the blending of almost indescribable colours and unique designs make their study most fascinating. I have often mourned that better care had not been shewn the collection, for the bright sunshine has robbed the butterflies sadly of their delicate tints. Still the Society may be congratulated, for by additions by purchase, by the generous gift of two cases by Mr. Edmund Rundle, F.R.C.S., one of our members of Council, and by the kindness of the Rev. Walter A. Hamilton, our collection is likely in the course of a few months to be numerically strong in genera and species of recently captured butterflies, so that we shall turn the collection, as it were, back for half a century, and realize again the beauty and inestimable value of those sent by General Jenkins.

The issue of a guide to these butterflies, on the lines I have described, will have to be deferred until they are arranged in the cases in the Museum. The major part of the manuscript relating to their classification with descriptions of generic and specific habits, I have already written. Of some of the forms I cannot gain yet any information as to precise position, but articles and books on Indian Butterflies are being so rapidly issued—the subject occupying now the attention of some of our cleverest entomologists, that this difficulty need not, I trust, unnecessarily delay its issue when the butterflies are laid out. The delay, too, will enable new species which are now being added to the collection to be described in the guide.

Briefly, in our Museum collection we have of Family I, *Nymphalidae*, butterflies with genera shewing mimicry of one another and of plant forms on which they rest or feed, forty genera and eighty-three species. Family II, *Lemoniidae*, one genus and one species. Family III, *Lycanidae*, to which our English Coppers, Blues, and Hairstreaks belong, eleven genera and eleven species. Family IV, *Papilionidae*, which includes our White Cabbage Butterflies, Brimstones, Clouded Yellows, Orange Tips, and Swallow-tails, eleven genera and thirty-four species. Family V, *Hesperiidae*, or Skippers, nine genera and eleven species, altogether, seventy-two genera, and one hundred and forty species. Such a preponderance of generic forms among so few species is of great interest to the reflective student.

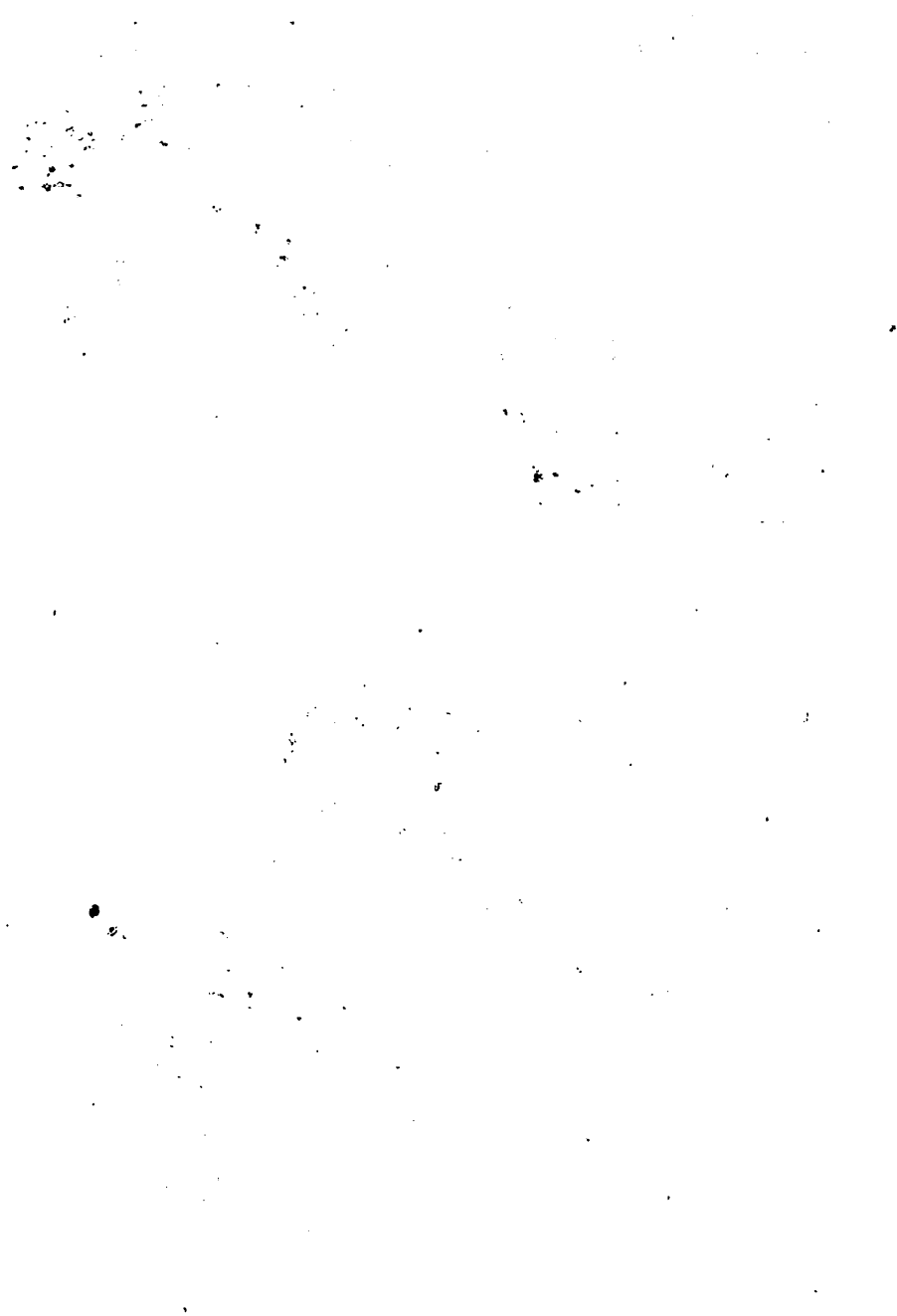


Fig. 13.



Fig. 14.

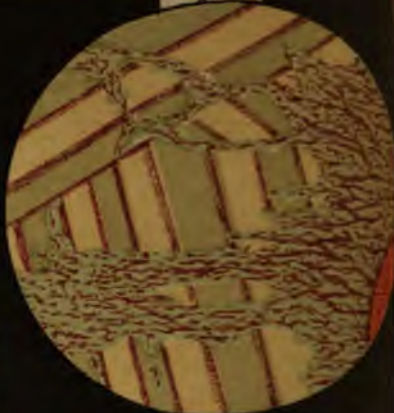


Fig. 15.



Fig. 16.



NOTES ON THE LIZARD ROCKS,
(CONTINUED.)

By THOMAS CLARK.

Since my last paper was written, I have continued working on the rocks of this district, seeking for further confirmation of their volcanic origin, and the great changes that are still taking place in them.

The contrast between the massive gabbros and the hornblendic gneisses has baffled all former research; but I believe I am now in possession of materials to bridge over or connect the two extremes, and show their origin and progress from the massive to the banded structure.

I foreshadowed this in my last paper, but was not then in possession of sufficient materials to fully establish the fact; I have since procured fresh supplies from the quarries, carefully studied the principal cleavage of the rocks, and cut cross-sections thereto; a course which I often repeated, and thereby arrived at the conclusion that I had discovered the origin and development of the hornblendic structure in some of the gneiss of the Lizard district. Microscopic illustrations of the slides obtained from these specimens I append.

COVERACK.

Fig. 13, plate D.—From a dark coloured pebble of gabbro selected from the beach at Coverack. It is highly magnetic, and shews what I take to be the origin of the banded structure of these rocks. The olivine is much fractured, and appears to have been the first mineral to succumb to the change, radiated fractures passing from it into the adjoining minerals, as if it acted like numerous charges of low-class explosives. The general direction of the fractures are in the principal cleavage way of the rock, many of the fissures being within $\frac{1}{16}$ of an inch of each other, and are traceable in many cases (where such thin slices as are necessary for microscopic work would admit) from olivine to olivine, as if within this mineral lay the expansive powers that fissured them: the surrounding minerals in this slide shew more numerous fractures in the felspars than in the

augites, the changes in the former being more advanced than in the latter. The percolating matter from the olivine appears to have a greater effect on the felspar than on the augite, the first formation of anthophyllite being here found, filling the new formed fissures in the felspar, where in contact with the olivine; more rarely may be seen anthophyllite forming in the fissured augite, but the general change is from augite to actynolite, and this does not appear to have originated from its contact with, or percolations of, olivine matter.

GABBRO FROM DEAN POINT.

Fig. 14, plate D.—This rock specimen, broken from the mass, and, as in the slide from Coverack, the sections carefully cut from across the principal cleavage way, reveals a more advanced stage in the new hornblende bands, than the former. Every available fissure is filled, and probably many a splinter of felspar, such as is discernable in the slides from Coverack, is used up in the formation of the anthophyllite; there is yet much olivine unexhausted, and some with but very faint changes visible, while in others the change is apparently complete, and the hornblende occupies a far more extensive and elongated position than the olivines did before the change. This evidence I think proves that the apparent combustion in this rock was not instantaneous, but slow and continuous, and probably not far in advance of denudation. The change of the olivine, also, brings to view magnetic iron, which is in sufficient abundance to strongly deflect the magnet from its normal position.

MANACLE POINT.

Numerous opportunities have been afforded me by recent quarrying at this Point, to get fresh samples of these rocks, which appear to have offered much more resistance to atmospheric denudation, and the powers of the ocean, than the neighbouring olivine gabbros of Dean Point. They have a higher specific gravity than others of similar felspathic appearance, and show iron in far greater abundance, but the affinity for the magnet is faint in comparison with other rocks of the district. This proves that the iron it contains is not altogether magnetic. Then comes

the question, what is it the residue of? The iron residue of olivine being magnetic, could this rock have been an olivine gabbro? Yet the magnetic influence does not agree with such a view, neither does the microscope reveal a particle of what might be taken as traces of such as is found in the Lizard rocks in general. Sphene is very abundant in every stage of change, from the almost perfect mineral to a hydrous oxide of iron, which finally masks all former traces of the original mineral; and it is probably due to this iron cement that the Manacle rocks have so long survived others containing a lower percentage of iron. The decomposition of sphene does not appear to have possessed such expansive powers as olivine, therefore the rock is not so fissured in the cleavage way, but faulting of the minerals is more abundant than in the olivine gabbros, the faults in the felspars being principally filled with anthophyllite. The felspathic bands at Porthallow have also but slight affinity for the magnet, which corroborates my former views respecting the source from which they flowed. The two classes of serpentine from the same locality shew different degrees of magnetic affinity, according to the composition of the original matter; the more pronounced olivine serpentine closely corresponding with that of the Black Head.

BLACK SERPENTINE FROM THE NEIGHBOURHOOD OF CADGWITH.

Fig. 15, plate D.

A hand specimen of this rock is on the table, in colour it is almost an invisible green or black; its specific gravity, is 2.209. Some beautiful grains of brown, yellow, and almost water-clear olivine are yet visible. Under the microscope, the magma is found to consist principally of light green serpentine, crowded with magnetite; in some spots in the thin slide the magnetite is so abundant that light does not pass through it. Traces of enstatite are also visible, but the network structure after olivine predominates; traces of other minerals have not yet been observed.

It has a high affinity for the magnet, which might be anticipated from its general character, serpentines and somewhat similar are abundant in various parts of the Lizard district.

PORTHALLOW BEACH. (*Pumice Stone.*)

I have occasionally found pumice stone on this beach, associated with gabbro, gneiss, serpentine, and tufa, though not now a floating article. The infiltration of iron into the pores gives to it the colour of jasper; the weathered parts reveal its original form after bleaching out the iron, the remaining portions show sufficient vesicular structure to identify it as being an ancient pumice stone.

OBSIDIAN FROM PENVOSE.

Here an abundance of this rock is found *in situ*, with H 6.5, specific gr. 2.284. It is banded, possesses a fluxine structure, and contains many microliths and dendritic formations, fragments of felspar and other kindred minerals; some of the glassy bands are more advanced in devitrification than others; magnetism very faint.

NATIVE IRON FROM THE LIZARD DISTRICT.

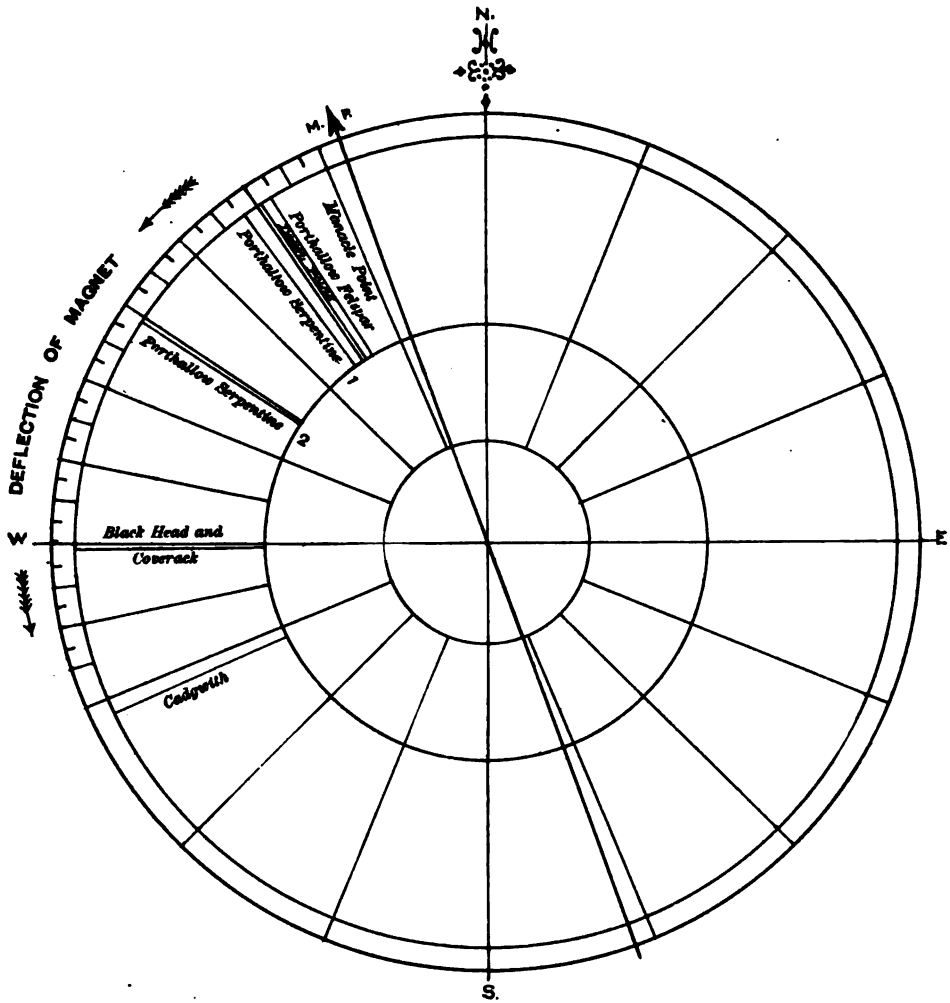
Fig. 16, plate D.

Iron in one form or another is very abundant, and is supposed to be the principal element of this planet; in its native state it is very rare; it has been found in disseminated grains in basalt and kindred rocks, and also in large masses in Greenland, where probably it was derived from the disintegrated basalts of that region, having been found associated with them. It so closely corresponds with meteoric iron as to cause in the minds of some a doubt of its telluric origin. It has also been found in the Western Islands of Scotland and N.E. of Ireland in similar rocks, viz: tertiary lavas and basalts, and now, for the first time I believe, I find it in England, in small dykes that traverse the gabbros and serpentines of the Lizard district.

Native iron is reported by Dr. Johnston-Leves, to have been found in the apex of Vesuvius in April, 1888.

In preparing some slides from the small dyke at Dean Point, iron was observed that did not correspond with magnetite in general. When examined under the microscope with reflected light, it was found to contain a bright central core surrounded with a dark margin. Tested for metallic iron with sulphate of copper, each trial was not alike successful. A sample from a similar dyke near Coverack, when bruised, produced much larger

MAGNETISM OF THE LIZARD ROCKS.



T. CLARK, A.M.S.

grains of bright iron, the process removed the dark margin of magnetite that might be visible in a slide, and left the strong bright core, which was malleable, and could be flattened with the hammer.

THE MAGNETISM OF THE LIZARD ROCKS.

The bad repute of the Manacle rocks first led me, out of curiosity, to apply the magnet to them, while preparing my slides for microscopic work, and then my study of the Lizard district induced me to test the magnetic influence of the rocks along the principal parts of the coast, from Porthallow to near the Lizard Point (Penrose), and the results are so widely different, I consider them worthy of record.

The first means employed in endeavouring to arrive at the quantities of magnetism at the various points, was by suspending a bar magnet (12-in. long \times 1 $\frac{1}{4}$ -in. wide, $\frac{1}{4}$ -in. thick) with a silk thread, over a card arranged similar to that of the mariner's compass. The samples tested were of unequal sizes, and engendered a suspicion that this was the cause of the very varied affinities indicated, and no percentage of power being properly arrived at, the results I considered unsatisfactory.

Another mode was then adopted, viz: by cutting thin slices of the rocks, about 2-ins long and $\frac{1}{4}$ -in. wide, weighing them accurately with a fine balance, and while each slice was in the scales, fixing the magnet horizontally a short distance over, until the slice immediately raised to it; while adhering, the scales were raised again to an even beam, the weights removed from the opposite pan until the affinity between the slice of rock and magnet was overpowered. By this means I am in a position to make the following assertions.

The Manacle rocks, of ill repute with mariners for their supposed magnetic influence, have no title to such a character, their affinity for the magnet being only equal to 1 ton in 3,000. The olivine gabbros of Dean Point and Coverack, the brown serpentines of the Black Head, and the black serpentine of Cadgwith, as will be seen from the illustration herewith, were the principal deflectors, the black serpentine having an attraction equal to 1 ton in 19, or over 155 times greater than the rocks at the Manacle Point

The weight of the slice without magnetic influence was 76 grains, to test its attractive powers I placed the magnet over it, when the weight was reduced to 72 grains, on applying it under the slice, it increased to 80 grains; this proved an affinity of 4 grains, either way.

The various rocks referred to extend over an area of 50 square miles, and probably vary from 50 to 500 feet in thickness. Here is magnetism in magnitude, food for contemplation, dread for the mariner; but a grand field for the mineralogist.

ON A TUDOR MANSION AT TREFUSIS, IN MYLOR.

By HENRY M. JEFFERY, F.R.S., Vice-PRESIDENT.

"The Trefusis family is to be traced as resident at Trefusis in Mylor, the seat of their descendent, Lord Clinton, four generations before 1292." "On the death of George, Earl of Oxford, in 1791, the title" (*i.e.*, the barony of Clinton and Say, created by writ in 1299, and being then in abeyance) "was claimed by George William Trefusis, Esq.,* the descendent in the fourth generation of Francis Trefusis and Bridget Rolle, (grand-daughter of Theophilus Clinton, Earl of Lincoln.) The claim was allowed by the House of Lords in 1794." Lysons' Cornwall (1814).

The first Lord Clinton lived and died at Trefusis, and in 1797 was interred with his ancestors in the parish Church of Mylor. His eldest son, the second lord, a distinguished officer, who was aide-de-camp to the Duke of Wellington, chiefly resided in Devonshire.

The family seat at Trefusis was thenceforward mostly untenanted, although occasionally let to strangers, and became dilapidated, until it was taken down last year (1890) by the present Lord Clinton (the lord-lieutenant of Devonshire) and replaced by a handsome and loftier, but less spacious, house near the site of the former mansion. The last mansion had been built in the Georgian period, in the form of an indented quadrangle, and enclosed a small quadrangular garden, which was approached by a descending flight of steps. Its ground plan is given herewith.

In dismantling the edifice, the architect and contractor were surprised to find large portions of ancient masonry, window-frames, mantles, arch-stones and jambs, all of wrought granite, which had been built into the walls, and concealed from view.

* The pedigree of the family at Trefusis is given by Col. Vivian in his *Heralds' Visitations of Cornwall*, p. 463. An amusing sketch of a visit paid to Mr. Trefusis and his Georgian residence, is given by Beckford (*Vathek*) in 1787, (*Travels*, Vol. II.), and quoted by Cyrus Redding, (*Itinerary of Cornwall*, p. 131.)

In style and character this ancient work was contemporaneous with the architecture of Henry VII and VIII. The four-centred arch stamped it of the Tudor period.

It was also recognised that the ground plan of the Tudor mansion was identical with that of its Georgian successor, with the exception of the saloon, which was projected on the south front of the Georgian house, and partly erected on an artificial terrace then raised.

By the courtesy of the architect, James Hicks, specimen drawings of a stone mantelpiece* and a porch† are herewith published, as well as the common ground plan of both Tudor and Georgian mansions. To the same gentleman I am indebted for the accompanying descriptive letter.

Redruth, 19th May, 1890.

TREFUSIS.

Dear Sir,

I send herewith plans of the old buildings at Trefusis, and sketches of the Tudor mantelpiece and doorway discovered in pulling down the old house

We also discovered several stones of the ancient windows, which, however, are somewhat mutilated, but they are clear indications that some of the windows were of considerable size. And there are lots of wrought stones in one of the yard walls. Altogether the discoveries show that the Tudor house was of considerable dimensions.

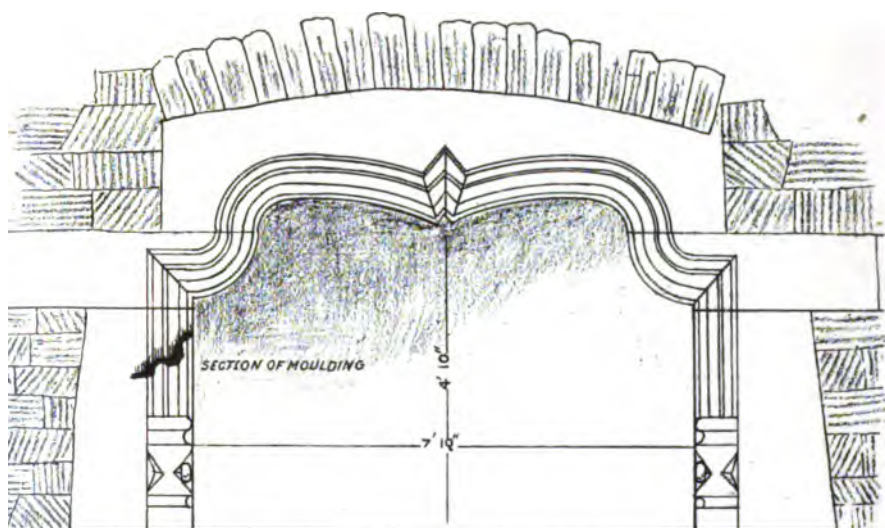
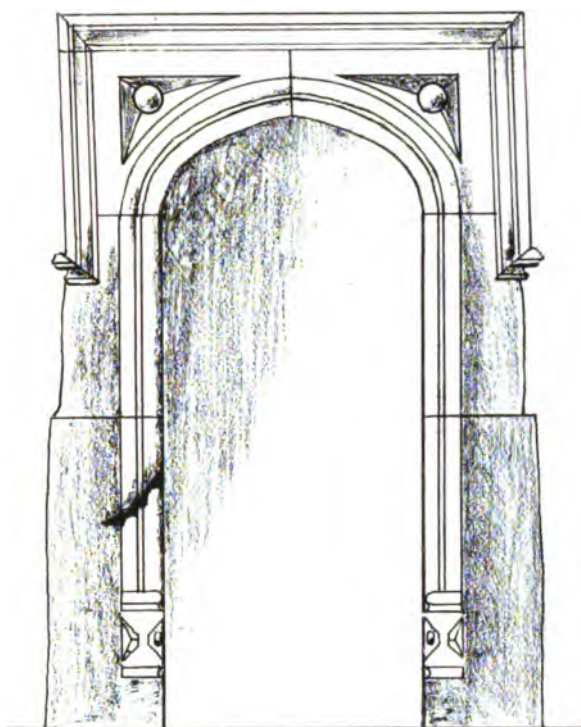
The quaint springer stones of the gables, show that the roofs were only of moderate pitch, that is, at about the same pitch as of the contemporary churches, erected in the reign of Henry VII.

The back doorway of the house is the original Tudor four-centred archway, so also are the front cellar door and other doorways.

From the fact that the stones of the original front doorway, are moulded inside and out, I gather that it was an open porch, and I think it stood in the centre of the south front where the Georgian saloon was afterwards built. I am inclined to doubt if the large run of cellars were built originally with the Tudor house, as they would have been entirely outside the building. I think they must have been built when the terrace was formed.

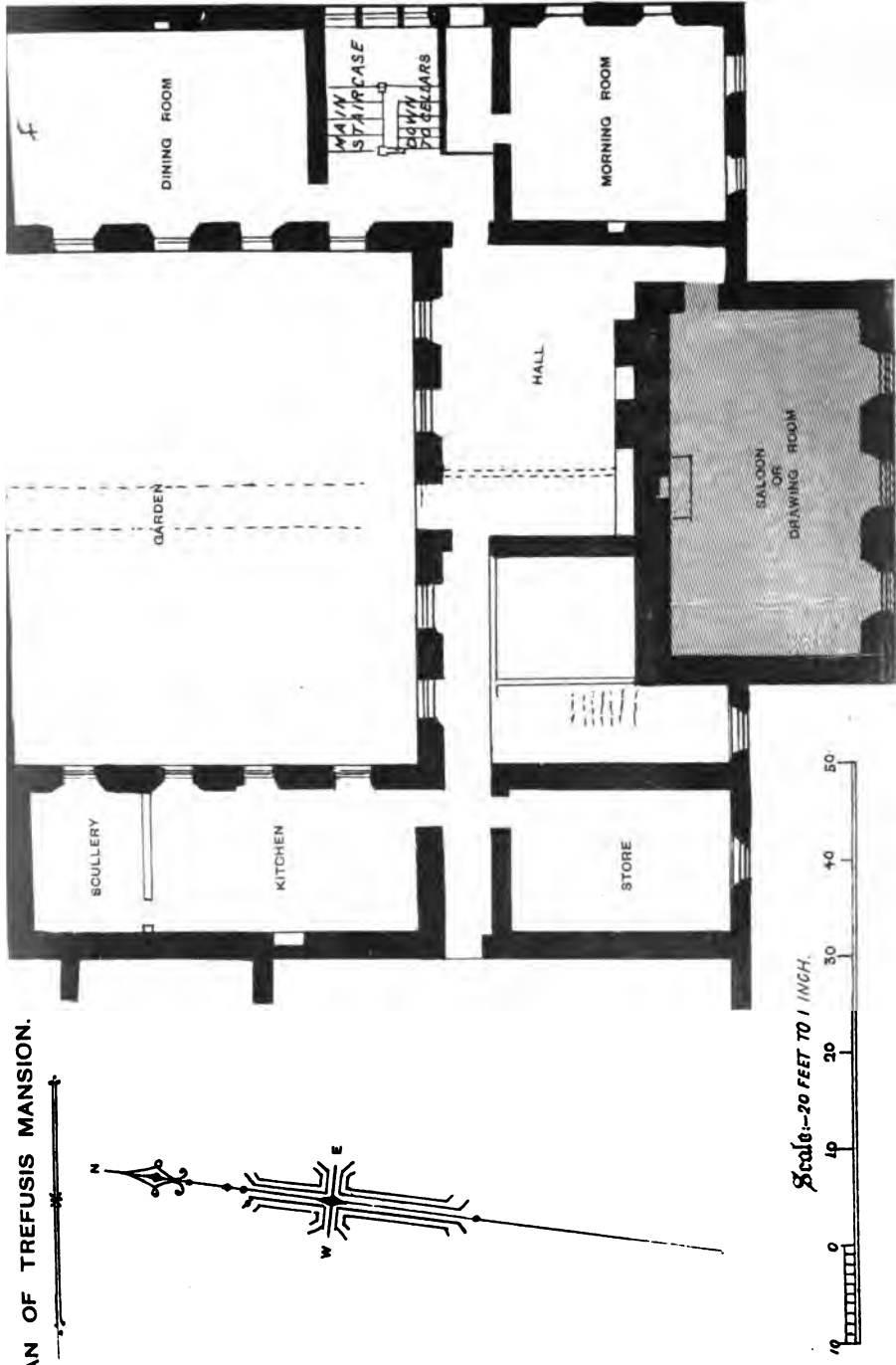
*This has been fixed in the hall of the new house. Another mantel-piece, similar in pattern but smaller, has been placed in the upper room.

†This porch is believed to have stood in the centre of the site of the Georgian saloon, and is preserved near the N.W. angle of the new house, as a side entrance. Two ancient window frames are also re-fixed,



Tudor Doorway and Mantlepiece, found in the Old Mansion at Trefusis.

PLAN OF TREFUSIS MANSION.



My impression is that the windows and doorway of the cellar under morning room were external, therefore showing that the Tudor house could not have had the existing terrace on the south front.

We have discovered some bricks 7 inches by 3 inches, and 1½ inches thick, of a greeny yellow clay; I think they must have been imported from Holland.

The Tudor mantle and doorways, and some panels, the oak fittings of library, some plaster casts, &c., will be refixed in the new building.

The Cornish masons of the olden time did not pay proper attention to mortar, and many of the Tudor churches have suffered in consequence; so also did the Tudor house at Trefusis, where the mortar was little better than wetted earth without cohesive properties, which accounts largely for the settlements and ugly cracks in the ancient walls.

Can you tell if Trefusis was ever used for the housing of prisoners of war? * Legend states that there was a sort of entrenchment near Kiln Quay.

Yours truly,

JAMES HICKS.

H. M. JEFFERY, Esq.

Some additional particulars may be noted.

The low pitch of the roof, as indicated by the springer-stones, could not have been uniform; for certain apex-stones, since found, point out a greater angle of elevation.

The cellarge of the Tudor house was originally confined to the S.E. corner,—where the windows and doorway were external.

A remarkable sub-way leads down the ravine S. from the mansion, arched and lined with brick,—5 feet high, and 2½ wide on the inside. It has been penetrated for 300 yards, and found not to extend to the beach, but it might have reached it at some time. The entrance was in the centre of the Tudor house, or, in later times, of the Georgian hall. But this sub-way was intercepted by the walls of the Georgian saloon, after which it again proceeded, so that it must have been constructed in the previous Tudor period. † Outside the Georgian saloon underneath the terrace, a court-yard was laid bare, paved with

*Prisoners were interned at Roscrow in Gluvias, and Kergilliaek in Budock, but not, it is believed, at Trefusis.—[H.M.J.]

†There is a similar sub-way at Pendennis Castle.

pebbles, and resting on the sub-way. This fact further confirms its date. Lord Clinton has mentioned a family tradition, that it was a covered entrance to the mansion from the beach.* It seems too spacious for a sewer, as some consider it. In the Georgian period two ordinary stone-drains, 14 inches wide, and 12 high, were made to issue into it.

The bricks used in this sub-way and for the main work, were probably burnt† from a bed of clay, which runs through the grounds. Dutch bricks were probably imported for better work.

Indistinct traces of an entrenchment are seen on the ground situated N.E. of the mansion, towards the grove of the bowling-green. If this could be established, I should be disposed to interpret the name of Trefusis as the 'house of an entrenchment or camp', (Corn. Foza, voza, fose.) Pryce interprets Trefuses-is-us as 'walled (fozes) habitation' (*Archæologia Cornu-Britannica*). By an old-fashioned quaint rebus, the Latin words 'tres fusi' (=three spindles) were read into the Cornish name; hence the family arms‡ of Trefusis are derived; Argent, a chevron between three (w)harrow spindles, sable. Motto:—*Tout vient de Dieu*.

Penfusus was an alternative name both of the headland and of the mansion; the prefixes 'pen' and 'tre' are often confused. Leland, *Collections* (1533-1540), "there lyith a litle cape or foreland within the haven a mile dim.§ almost again Mr. Kiligrewis house,|| called Penfusus." "There dwellith an auncient gentilman, callid Trefusis, at this point of Penfusia." Further on, Leland speaks of "the point of land of Trefusis."

*It is supposed to have been used for military purposes of defence; if the house was attacked, defenders could issue from the sub-way, taking the assailants both in front and rear.

†The remains of a kiln are still visible at the foot of the ravine, near Kiln Quay, the landing place from the harbour.

‡The coat of arms is cut in granite over the E. or principal entrance of the new house.

§Lat.=half.

||Now Arwenack Manor-office.



POZO STONE & CASE.
TRURO MUSEUM.

THE POZO PICTORIAL INSCRIBED STONE.

By HENRY CROWTHER, Curator of the Royal Institution of Cornwall.

Amongst the gifts in our Journal for the year 1886, is recorded one from Mr. Robert Harvey, of "A large Inscribed Stone, from Iquique, South America, evidently describing the journey of one of the tribes."

About two years ago this stone, resting uncovered and almost unnoticed on a stand in a corner of the basement of the Museum, began to attract considerable attention. At my request Mr. Harvey agreed to defray the cost of its removal into the Archæological room upstairs, to provide a table for it to rest on, and protect it with an oak and plate-glass case; at the suggestion of our then President, Mr. John Tremayne, the table was made to turn, so that the stone, weighing about half-a-ton, might be revolved as wished to the most favourable light. These improvements have naturally made the inscribed stone an object of attraction in the Museum. I am so frequently desired to explain what I know of it, and asked for, or desired to write a guide book on it, that I asked our Honorary Secretary, Major Parkyn, if he could induce Mr. Harvey to help us in such a matter. Through his influence the same generous response came from Mr. Harvey which he has ever shewn to this Institution, and he expressed his willingness to give ten guineas towards a museum guide-book to the stone. With the hope of making such a guide to this valuable acquisition, I have for some time sought fresh light from other observers; it will be found in the sequel that I have gone in a great measure against present recognised opinion and more in agreement with older observers. This I cannot help! Perhaps it arises from my reading the stone pictorially, and reasoning on the incisions by the same methods which one follows in ordinary science. In geology we say rounded stones were formed by water, and that a limestone was made by some vital agency. If we find a fossil shell, say of the genus *Conus*, a kind of mollusc now living in the Indian Ocean; or a fossil fruit of *Nipa*, a palm tree, we infer that in a great measure the conditions, which allowed of their growth in geological times, were the same then as now. We reason from the present to the past, from the known to the unknown, and in

archæology one must do the same. Thus to understand the stone the visitor must know something about its archæological, geological, and recent histories.

By the recent I mean its history until it arrived here. In this connection I am indebted to Mr. Harvey for these facts. "Several inscribed stones, about six, were at the foot of a hill about a league from Pozo al Monte. The rocks of the hill had figures of a hand-staff, a fish, and some curious geometrical figures made on them, supposed to be signs to the traveller of the direction to be taken to go to the sea coast. This hill is about 4,000 feet above the sea, and from it many mummies have been taken, chiefly in a sitting posture, holding a vicuña-wool sack containing about half-a-pint of maize and some bone hooks, made apparently for catching fish. The stone sent is the best and plainest figured. The next best rolled off the railway car and struck on a rail, which partly obliterated the inscriptions. The railway passes about a mile from the foot of the hill from where the stone was rolled, over four planks, by placing two abreast and moving ahead in rotation. About twelve men took four days to do this. It was then rolled up an inclined plank on to a railway truck, and from thence taken to the railway landing stage at Iquique; 42 miles distant, and lifted by a steam crane into a launch, and from the launch on board a sailing ship which touched at Falmouth for orders and there landed the stone. The other remaining stones were taken by some German geologists, who were making a scientific report of the Lesser Andes for the Chilian Government. One stone, much smaller than the one in the Truro Museum, is in the Government Museum at Santiago."

This recent history, so succinctly put by Mr. Harvey, authenticates his valuable gift. From the locality where found, Pozo al Monte, or "well of the hill side," and for brevity, I have named the stone in the Museum "The Pozo Stone."

The physical geological history of the stone is perplexingly difficult, especially as one has to speak about conditions one has never lived under, and it is especially hard for those who live in Cornwall to realise a land without rain, but the track of country from whence the stone was brought is rainless. "Although within the zone of the south-east trades, the whole coast district of Peru and Northern Chil  lacks the moisture necessary for vegetation,

because the currents of air are deprived of their humidity in crossing the Andes. On the other hand, the winds from the Pacific blowing from the cool sea, and being of low temperature, their scanty vapour is dissipated by the heat radiated from the land without leaving a drop of moisture to refresh the thirsty soil."* This absence of rain in Peru has a most conserving action on archaeological objects, and is the reason why the incisions on the stone are so perfect, although undoubtedly worked so long ago. Mr. L. Fletcher, F.R.S., Keeper of the Minerals in the British Museum, in an article on "Meteorites from the Desert of Atacama and its neighbourhood," in the *Mineralogical Magazine* for October, 1889, says, "The air of the Desert is so clear that a four hour's journey really meant a couple of days of hard travelling; Harding states that 'a page of ordinary note paper if doubled over and pressed with a paper knife will break in two when opened out.' In so dry a climate a mass of meteoric iron of moderate size will endure for countless ages without rusting away."

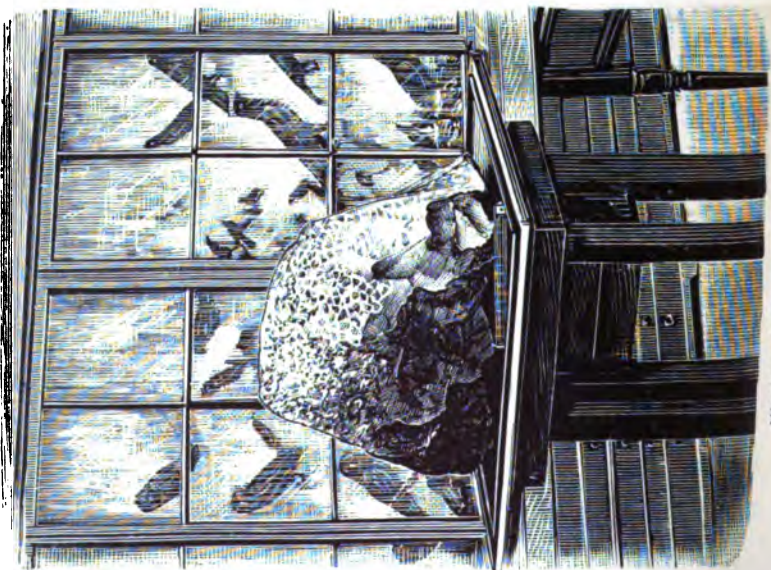
Though the incised characters have not been materially acted upon by the weather, the body of the stone has been subject to its long continued influence, and is weathered in such a fashion that not a single person who has visited the country can help me to a specific explanation of how it has been accomplished. It has been suggested that dew may have had some action on the stone, we know fogs are common on the Peruvian coast, but of the quantity of dew in the rainless region I cannot speak, my idea, however, is that greater volumes of water have had to do with this weathering than dew would furnish. The weathering on the stone is of two degrees, mild and intense. In shape the stone is roughly five-faced, and on four of the five faces it has weathered only sufficiently to round off those angularities which the stone would possess when it fell from some escarpment in the mountains. This is exactly what happens to blocks of limestone in Britain. On the surface of the Pozo Stone, as on weathered fossiliferous rocks at home, organic remains stand up in ridges and points left by the quicker weathering of the softer matrix; the difference in the molecular arrangement of the organic and inorganic limes being the chief cause of this.

* "Central, West Indies and South America," W. H. Bates, 3rd edition.

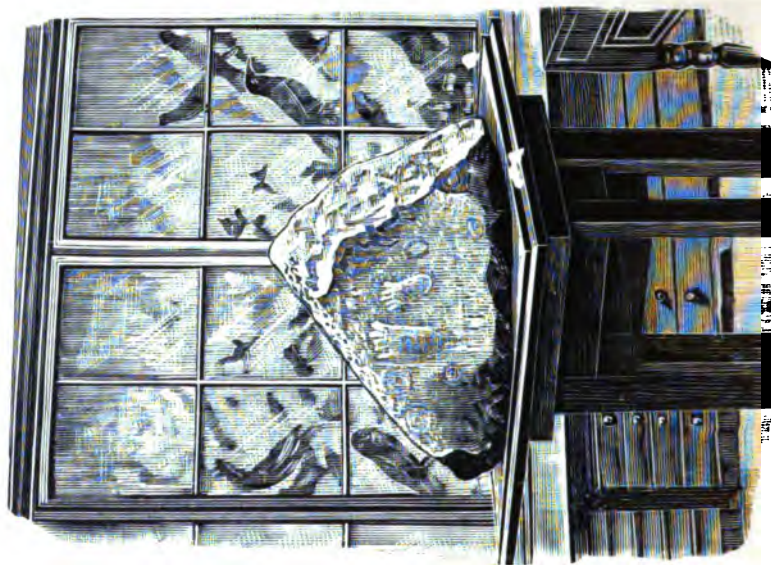
The fossiliferous nature of the Pozo Stone, revealed to the naked eye by this gentle weathering, I have further confirmed by an examination of two microscopical slides, kindly prepared by Mr. Thomas Clark, from a chipping of the stone. In composition it is a limestone, with fine bands of pure calcite running through it, and is crowded with fossils, chiefly corals.

The fifth face of the stone, in area equal to one fourth of the whole surface, is intensely and roughly weathered, yet on it the gradual action of the weathering can be traced from its incipency to deep hollows. A film-like deposit of oxide of iron, of varying thickness, has had some influence on the intensity and direction of the carving action of the weather, and has preserved portions which run up to sharp edges and prominences. A glance is sufficient to shew that these acute edges and prominences could not have been formed if the stone had been subject to the action of water in the bed of a small stream or river, or to the constant action of spray, their sharpness would have been destroyed and there would have been a rounding off, as on the other parts of the stone. Neither could the hollows have been formed on the weathered surface so deeply if sufficient time had not been allowed for water to chemically eat into or dissolve the stone.

My belief is that such weathering must have been done by intermittent action, *e.g.* by the falling of rain at intervals, this meteoric water, laden with carbonic acid, would dissolve the stone and would remain for some little time. Of course we cannot have rain in a rainless region, but if the stone has registered former Peruvian rainfalls and still carries that record, it is of high value to the physical geologist. In composition it is a limestone, crowded with corals, a deep-sea limestone, and the Andes, like all the highest mountains of the earth, contain limestone formations, their presence in such situations being due to volcanic action; perhaps nowhere better than in the Chilian and Peruvian regions can we get recent evidence of the intense and enormous lifting of the land, by volcanic disturbances. The Pozo Stone, built by marine organisms and then forming part of an Andian escarpment, is evidence of an elevation of the earth; such a disturbance of the level of the earth must have caused an alteration in the meteorological phenomena on its surface. A few hundred miles further north occasional showers of rain are



Weathered Side of Pozo Stone.
Turo Museum.



1st & 2nd Panels of Pozo Stone.
Turo Museum.

felt. In the Atacama Desert, which lies to the south, and which seems to have risen above the sea within a recent geological period, less rain, it is maintained by observers, falls than formerly. A good storm of rain, lasting for a few hours, only occurs at intervals of 20 to 30 years. "In this desert the valleys (*quebradas*) are pretty numerous, often 500 to 1,000 feet deep with almost perpendicular walls, evidently formed by running water, similar to the gorges adown which rivers flow on the eastern flanks of the Andes, near Cuzco, so that it becomes impossible to account for their formation except by supposing a greater rainfall than those regions are now blessed with."* Another interesting proof of former rainfall I gather from an observation made by Dr. Philippi, the Curator of the Government Museum at Santiago, who says "That in the Republic of Ecuador and in the northern parts of Peru there grows several kinds of plants which are also found in Chilé, further south, but nowhere in the intervening zone, *Berberis Darwini*, *Gunnera Scaba*, and the *Desfontainea spinosa*. And that the *Cervus Andisensis*, a deer of the Peruvian and Bolivian Andes, seems to be identical with the Guemul or *Corvus Chilensis*, a sort of roebuck, which begins to shew itself in central Chilé; they may differ in these plants and animals, but not much, and if the wide, rainless, and herbless desert of Atacama always existed in that state they could not have passed across it."

Mr. Harvey, writing on this point, gave me some most interesting facts on the Tarapaca Desert, in which the stone was found. "In seventeen years I saw rain three times. Within three miles of where the stone was found, we have abundant proofs of vegetation in the great submerged forest of the Tamarugal. We find, some ten feet under the surface, large trunks of trees and semi-fossilised branches. Nitrate of soda was formerly manufactured by using this fuel only, and I have myself distilled water, for the use of some 1,000 men of the Peruvian Army during the Chilé-Peruvian war, from the brackish water found near Lagunas, evaporated by this fuel, which was dug up and brought in by the soldiers. This shews the district could not have been always rainless."

* "Central, West Indies and South America." W. H. Bates, 3rd edition.

Hence, the peculiar and intense weathering which the visitor may see on one side of the stone was, in all probability, done ages before the milder action on those sides on which the petroglyphs or rock drawings are chipped, and the one on which the stone rests. The rough weathering tells of a time of intermittent rainfall; the gentler weathered sides of a higher elevation of country and the beginning and continuance of that rainless period which has allowed of the formation of nitrates of such soluble substances as Soda and Potash and the Chlorides of Copper and Silver.*

These considerations help us also to understand how the incisions on the stone have been preserved in apparently as fresh a state as when cut. So conserving is the climate from whence the stone was brought, that mummies, of unknown nations, with articles having some religious significance, are constantly being found in an excellent state of preservation. We learn, too, that the incisions are upon the weathered surface of the stone because the carver or carvers of the pictorial stones took up such weathered blocks of rocks as were adapted for the purpose, no two being alike in shape or size.

How were the incisions made? That they are Indian work I do not doubt, but I am not inclined to agree with Mr. Thomas J. Hutchinson that they were done with an iron or a copper implement. Iron implements were unknown to the people who carved this stone. The petroglyphs on it are extremely primitive in character, and very feebly incised. Mr. R. B. White, an astute observer, in his study of the "Aboriginal races of the North-west provinces of South America," says "The material which the Indians used for their tools was stone. * * * * The volcanic rocks of the country furnished stones of suitable hardness, and the mountain torrents provided pebbles already worn down into shapes, which diminished the labour of fashioning them into implements. * * * * Hatchets, adzes, chisels, hammers, and such-like implements of all sizes are found, and, as a rule, they are beautifully fashioned and ground, and were made into shape by the aid of massive corundum, which is found in the country."†

*See general Mineralogical case in the Museum for Atacamite, a Chloride of Copper from the Desert of Atacama.

† R. B. White, Journal Anthropol. Inst., Vol. 18, p. 247.

In all likelihood a stone implement was used to incise the Pozo Stone, and that it is of Neolithic age and not newer.

In many of its petroglyphic characters, those on the stone do not differ from others found in every part of the world, and why should they? It is probable that the district from whence the stone came and the provinces around, was the centre from which primitive civilization spread in America, and we can understand how, in earliest times, the simplest symbols would acquire universal usage. A glance at the Pozo Stone shews characters familiar everywhere on stones of a similar nature, circles, like some which I have seen on blocks of millstone grit on Ilkley Moor, in Yorkshire, and such as are inscribed on stones in many English counties from Cornwall to Northumberland. In Scotland some have two circles connected by a sort of bow, the spectacle markings; these are the first incisions on the stone in the Museum; and in Ireland, and universally abroad, these cupiform markings are known.

Mr. R. B. White, in his paper, already quoted, on the aborigines of South America, says "Throughout the whole of this great country, I know of no vestiges of buildings nor of any monuments left by the millions who once lived there. Near Titirive, in the State of Antioquia, there is a group of large stones having circles—some single and some concentric—some with a dot in the centre and some without—sculptured upon them. But it is not possible to connect these with the tribes of whom we have any historic record." On a sculptured dolmen of Petit Mont, Avzon, Brittany, there are cut two feet, very similar to those on the Pozo Stone.*

There are incised, too, on the Pozo Stone, the figures of several men, such figures are cosmopolitan,† and necessarily so, as petroglyphs have in all cases to do with human actions, and it agrees, too, with many other petroglyphs in having serpents and birds inscribed upon it. It differs, however, from anything I have yet seen illustrated, in having on it the llama, or some variety of this animal, probably

* "The Sculptured Dolmens of the Morbihan, Brittany," by Rear-Admiral F. S. Tremlett, *Journal Anthropol. Inst.*, Vol. 15, p. 104.

† A most interesting series of drawings of Rock Sculptures are to be found in J. Russell Bartlett's "Personal Narrative of Explorations and Incidents in Texas, New Mexico, &c.," Vol. 2, who admits their great antiquity,

the vicuña, which is a small variety of the llama, larger than the alpaca and longer in the neck, a more slender animal, and held in great veneration; these animals the ancient Peruvian sused as beasts of burden, paid them Divine honours and worshipped them. We are told by Mr. Harvey* that many mummies were exhumed in the same hill where the stone was found, holding a vicuña-wool sack in their hands containing maize. There are several other special characters which I shall touch upon later.

Who were the carvers of the Pozo and similar inscribed stones :

In attempting to trace the antiquity of the nations who carved figures on stones throughout the northern parts of South America, one is led from the known to the unknown, and the result is but a guess. There is no history of any value about Peru beyond one hundred years before the landing of the Spaniards, and the accounts the Spaniards wrote are blaze and bluster, being in many cases utterly unreliable. When the Spaniards landed in South America, at the beginning of the fifteenth century, the Peruvian Empire comprised New Granada, Ecuador, Peru, Bolivia and Chilé. Before their time thirteen Incas had reigned. In tracing out the language little light is shed on the problem we are seeking to solve. "The Quichua, perhaps the most polished of all native American tongues, and which was spoken everywhere in the Empire of the Incas, is younger than the Ayamara, which is much more primitive, and from which was grafted the Inca, the secret language of the first Incas, and is the principal language of Bolivia; whilst in Ecuador is spoken the Quiteño, said by some to be a northern branch of the Quichua, but looked upon by Bollaert, who studied the subject on the spot, as a primitive form of the common mother tongue, on which the Quichua was grafted, after the conquest of this region, by the Inca Huayna-Capac."†

We learn then that the Incas were most likely of Aymaran origin, which is interesting because it takes us to a people more primitive than the Incas themselves. The Chinchas or Chinchasuyo and the Huancas Indians, too, are more primitive Peruvian races than the Incas.

* Page 404.

† Central, West Indies and South America, by H. W. Bates, 3rd edition.

Another proof of an antiquity older than the Incas is that the ancient Peruvians were noted makers of pottery, made by women's delicate fingers, without the aid of a potter's wheel. This pottery was half baked, much like *terra-cotta*, many of the specimens found simulate animal and vegetable forms, but the large majority typify the human form. On some of the specimens the fret and scroll, used similarly by the Greeks, are common. The employés of the Peruvian Government, in shipping off the guano from the Chincha Islands, discovered, at different depths, many forms of this pottery, household gods, regal emblems, also a wooden idol, 35 feet under the guano, and a stone idol and several water pots 62 feet under the same deposit. Mr. Hutchinson, the British Vice-Consul in Peru, was so struck with this measure of antiquity that I cannot do better than quote his interesting way of putting the problem.

"Long, long time before the birds and seals began to accumulate guano on these Chincha Islands—indeed, so long, that I am almost afraid to guess—the Chincha people must have held sway down here. How many thousand years may have passed—in a case like this it is nonsense to talk of hundreds—since that stone idol was made and worshipped, before it got, by design or accident, in a position that the daily droppings of birds and seals covered it to a depth of sixty-two feet. How many decades have elapsed between this evidence of the stone age and the period of the wooden idol, discovered at a depth of thirty-two feet, or with twenty-seven feet intervening? Is there any living, calculating Peddar, who could calculate the birds required, and the period occupied, in such an operation."*

There is still another way of shewing the vast antiquity of these inscribed stones. They are pictorial, the incisions being of the rudest character. Pictorial writing is the most primitive of all writing, a child can draw a man before he can spell so short a word, hence in primal times men symbolized their thoughts by simple outlined pictures. Next arose ideographs, by means of which more complex ideas and even sentiments were expressed. In China the use of written characters dates back 3,000 years B.C., and its use as a perfect system of hieroglyphs by the Egyptians, 5,000 years B.C. "When Cortez and his followers invaded Mexico, they found

* "Two years in Peru," by Thomas G. Hutchinson, Vol. I, p. 104.

a grouped picture writing in use amongst the Mexicans, in which occasional use was made of characters of a phonetic capacity to express foreign names, in a manner analogous to that of the Egyptians, and they wrote these on cotton cloth and a fabric made from the Agave or American Aloe."*

It is evident that the Pozo and similar inscribed stones belong to a period long antecedent to the Incas Indians, these people are but as children of yesterday, a thirteenth Incas king only reigned when Pizarro overthrew him. Before them lived a nation of potters and artificers, the Incas were destroyers, but in Peru have lived nations or tribes which built monuments, fashioned stone and wooden idols, and fabricated gold, silver, and copper ornaments and pots, some of these objects were made so long ago that three score yards of guano have been deposited on them. From these nations and that peculiar civilization which no one has yet solved, but which has left, says Dr. Newberry, "from the frontiers of Chil  to Salt Lake in Utah, an almost uninterrupted succession of ruins * * * with a certain general resemblance throughout; so that we may fairly conclude that they are relics of different tribes or nationalities which were of common stock, or, at least, derived their civilization from a common source. * * * Hence, in my opinion, those who have attempted to bring all the history of this western civilization * * * within a thousand or two years have been in error, * * * for I am constrained to believe they may claim an antiquity equal to the oldest civilization of the Eastern Hemisphere."†

If amongst the Egyptians 7,000 years ago a perfected system of hieroglyphic writing was in use, we may be permitted to imagine a nation, older than the Incas, in Peru incising the simple petroglyphs of which those on the Pozo stone are examples. The history on the Pozo stone is merely pictorial, and I agree with the expression given in our Journal, in 1886, that it is an account of a tribal journey. But it tells more! And this is the most controversial part of this account. Mr. George Tate, a most practical observer, says of

* "The Origin and Progress of the Art of Writing," by Henry Noel Humphreys, p. 19.

† Abstract of Lecture on "The Ancient Civilizations of America, their origin and antiquity," by Dr. J. S. Newberry; Trans. New York Academy of Sciences, Vol. IV, p. 47.

British inscribed stones, "that they were done not less than 2,000 years ago, and probably some were done a thousand years earlier." It was early suggested that they were plans of camps, but Mr. Tate proposed a different view and advocated the notion that they were symbolical, representing religious thought. He ridicules that they may be read as camps at some length. In the same work the view is expressed by the Rev. William Procter, of Doddington, that the ring-like markings on stones are monumental inscriptions, in memory of departed friends, whose remains have been deposited near them.* My own view, taking the Pozo stone inscriptions, and many other forms, as guides, is, that petroglyphs may indicate camps, be symbolical of religion, of witchcraft, shew directions and positions, and in various ways express the thoughts of those who wrote them. There is apparently no precise rule that can be laid down, for the cupiform markings are accompanied in different countries by inscriptions of indigenous animals.

Rock writings certainly are widely spread, and in uncivilised countries they disturb the mind of the savage to a terrible degree. "In many places they are placed over water as conjurations for luck in fishing and hunting, propitiatory to the spirits of the fish and animals sought for, objugatory towards envious or malicious supernatural powers. The present Indians know nothing of the origin, age, or meaning of these monuments, and do not pretend to imitate them."† This somewhat weakens the idea that, in all cases, they are in memory of the dead. But we can well understand their dread, for "every Indian believes that he himself, and consequently every other man, consists of two parts, a body and a spirit. * * * * When a man dies something goes, something is left. The survivors necessarily distinguish in thought between these two parts, and they call them respectively by some such names as spirit and body. Hence the many rocks, on which are so called petroglyphs or rock drawings, are regarded with especial awe. It is unnecessary to multiply instances, further than by saying that every rock, and, indeed, every natural object, however different its body, is supposed

*"The Ancient British Sculptured Rocks of Northumberland and the Eastern Borders," by George Tate, F.G.S.

† "On a Petroglyph from the Island of St. Vincent, West Indies," by Dr. Brinton, *Proc. of the Acad. of Nat. Scs. of Philadelphia*, 1889, p. 417.

to possess a spirit such as that of man."† "The Indians of Guiana know nothing about the picture writings by tradition. They scorn the idea of their having been made by man, and ascribe them to the handiwork of the Makunaima, their great spirit."§

The literature on this subject is very extensive, sufficient has been referred to shewing the probability that petroglyphs are very old, that in Peru a nation has flourished long before the Incas, who were workers in the arts; that picture writing is a very ancient method of expressing thought, in fact the most primitive we are acquainted with; that these stone-inscriptions have no meaning to recent Indian tribes, and that they are symbolic of various expressions. Mr. Harvey says* that the rocks on the hill, from whence the stone was sent, had on them figures of a hand-distaff, &c., supposed to be signs to the traveller of the direction to be taken to the coast. This is an attempt to read the inscriptions, and similar efforts are being made everywhere by writers to learned journals. There are some stones, figured in Mr. Hutchinson's work on Peru,† from Yonan Pass of River Jejeetepeque, a little over forty miles from Pacasmayo, on which are inscribed some similar figures, amongst them being circles, with and without the central dot. Such petroglyphs near streams may have to do with the exorcising of evil spirits.

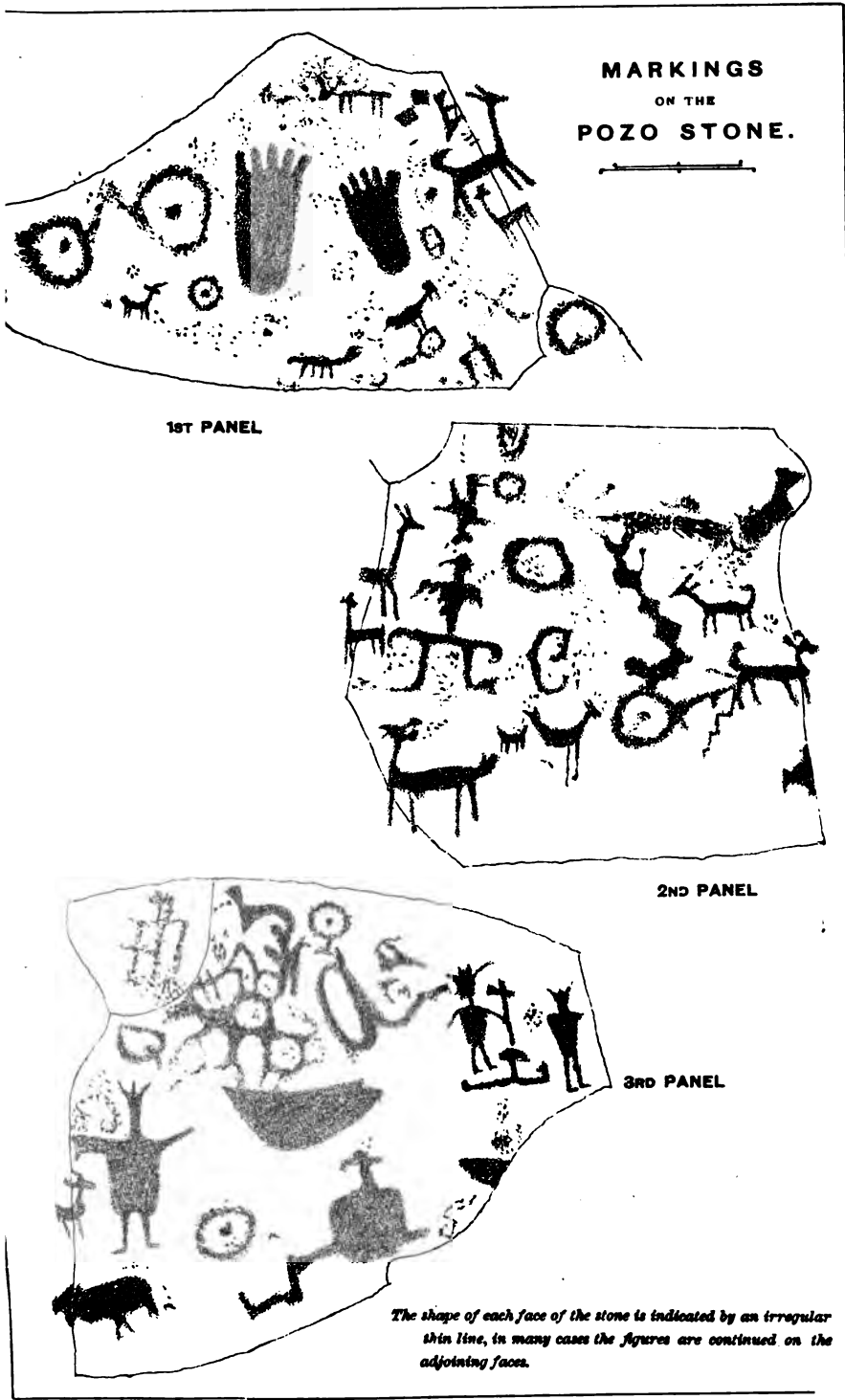
The Pozo Stone seems to have little in common with such stones, or those covered wholly by circles, but pictorially represents the doings of some king. The inscriptions run on three faces of the gentler weathered portion of the stone and one narrow strip beneath the deeply weathered aspect. On the first face are spectacle rings, a small deer, a small centred or dotted circle, two feet of different sizes, a deer, two square markings touching at the corners, a staff with two projections, a bird on a ring, another circle and the hinder part of a vicuña, which is completed on the next face of the stone, and beneath it, but looking the other way, is a smaller form of the same animal.

† "On the Animism of the Indians of British Guiana," by E. F. im Thurn, *Anthrop. Inst.*, Vol. II, p. 363.

§ "Indian Picture Writing in British Guiana," by Charles B. Brown, *Anthrop. Inst.*, Vol. II, p. 254.

* Page 404.

† "Two years in Peru," by Thomas J. Hutchinson, Vol. II, p. 176.



MARKINGS
ON THE
POZO STONE.

1ST PANEL

2ND PANEL

3RD PANEL

The shape of each face of the stone is indicated by an irregular thin line, in many cases the figures are continued on the adjoining faces.

The connected rings are probably camps, I feel no other explanation can be given of their meaning on the Pozo Stone, there are altogether, of single and compound circles, nearly a score on the short inscription on the stone, and I think, that the keenest advocate, of circles symbolizing suns and gods, must feel so many would be superfluous, and would render any legend illegible. The deer probably means a land of plenty. The vicuña, which would be used as the beast of burden, is on the stone, the vehicle, too, by which the artist conveys expressions of peace and disturbance; three of the five are peaceful, the remaining two express that mode of anger which is so characteristic of the llama family; the mouth opened in spitting and the turned head are faithfully copied.

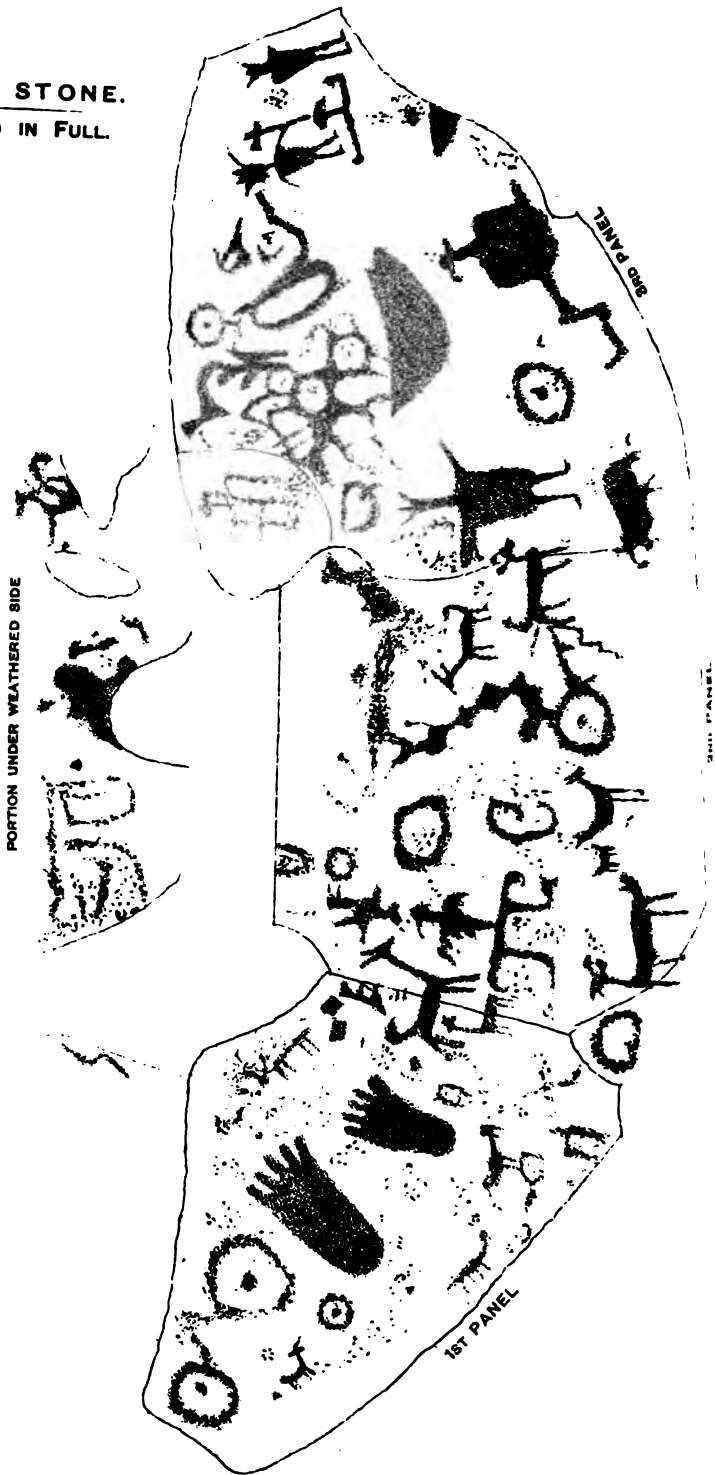
I read on this first panel of the legend that two large tribes [two circles] in alliance [the loop between] were ruled over by a great King [separate circle] who called together all his people [feet of man and child] so that they might travel [feet] to a land of plenty [large deer], in a southerly direction [two square incisions touching at the corner], and that they must be faithful [club with two stones attached, the symbol of stability], and that the great spirit [hawk on circle] would protect them.

The second panel begins with an ordinary vicuña, between which and a spitting disturbed vicuña is a grotesque figure of a man with a head-dress; taking the first vicuña as peace and the second one as vexation and worry, it seems reasonable to look on this human character as that of an enemy. Beyond him are several circles, and then one of the most, if not the most important incision on the stone. This is a dotted circle, from which runs a deeply incised path, with a small zigzag path running off it; in the pictorial writing of the North American Indians, such a line would signify a twisted or tortuous way. The main line ends by touching a deer. Proceeding up the stone, from the *self-same* dotted circle, runs a sinuous line with thickenings in it, the two lines enclose a spitting vicuña, particularly spiteful in position. If my reading be correct, it verifies the circles as encampments, for here the camp is broken up, the smaller party going on one path, and the larger party by another, along which there is not a single circle. Within these paths is the spiteful vicuña.

My reading of this second panel is, that the commencement of the journey was peaceful [vicuña undisturbed], but an enemy [grotesque picture of man] opposed, harassed and vexed them [vicuña spitting], but they encamped beyond [circles past enemy], afterwards encamping [large deep circle] in a less disturbed region [peaceful vicuña], but their enemies were too powerful [breaking up of encampment], so that part of the tribe went to one side of the enemies' country [area in which spiteful vicuña is] and sought, by means of a trail [thin zigzag path], to find a wider escape, but main portion of this part of the tribe [thick line] reached a land of plenty [deer]. The major part of the tribes went by a sinuous path [heavy line up the stone] around the enemies' country [area of spiteful vicuña], resting with uneasiness [no corral formed] during the journey.

The third panel shews a King in his robes with outstretched arms addressing the tribes, for both paths which run so sinuously around the enemies' country meet in him. Beyond and below the King is a dotted circle, near to an irregular patch, which is probably a river-fed lake. Above the King and to the right is another circle, and near, a cluster of confused circles, incomplete in their design. Close to them is a triangular patch, undoubtedly a lake. Above, nearly touching the clustered circles, is a man with upraised arms, and fire proceeding from his eye, dotted circle lies to his right. Below, is a finely incised coiled serpent with its head near to that of a second figure of the King. The King, here, has a battle axe which he holds over a sacrificial stone, beyond which stands a man, the sacrifice, with his arms chopped off. The human figures in this panel are very well executed; and the sacrifice in outline is so much like themselves, that I am inclined to look upon him as one of the tribe, and not as a prisoner. The stone is attached to or resting on the ground, as were the Kekip-Sesoators or sacrificial stones of the Toltacs, the founders of the earliest Mexican empire, and, taking our proportions from the size of the man, is of somewhat similar dimensions, 15 inches high and 14 inches in diameter. "The ancient Toltacs drew blood from their own bodies, * * and at times of great private or public necessity, when extraordinary blessings were much sought after, *such as the successful return of a long-absent war expedition*, * * * * this altar of the Temple of

POZO STONE.
LEGEND IN FULL.



Nature was thronged by many devoted worshippers, * * * * these self-inflicted wounds ranked equal to those received in the battlefield."*

I read the third panel thus, on the meeting of the tribes the King addressed them [King with outstretched arms] and some, probably with part of the King's party, encamped [circle with dot with portion attached] near to the river-fed lake [patch with two feeders] and the others [plain circle] near to another lake [triangular patch] and these made a settlement [cluster of incomplete circles], between the lake and a burning mountain, terrific but irregular in its action [man with upraised arms expressing surprise, and flame coming from his eye], and some encamped even beyond the volcano [circle beyond man], with royal blood [dotted circle with portion attached], and the spirit of the universe [serpent] moved, to which the King inclined his ear [King turned], and on the sacrificial stone [altar], a sacrifice was made in propitiation [man with arms cut off].

Briefly then, the stone probably relates the deeds of a King, who carried his people, from a northern settlement, to a land of plenty, amidst the lakes of South America; they were opposed by enemies whom they passed, and by others whom they avoided. Near these lakes, around which the mountains ejected fire, they formed a settlement and offered up sacrifices to the Spirit of the Universe.

There are some figures I cannot decipher, but all are reproduced on the drawings, even those little incisions which seem to have been the starts to other designs, and which do not seem to present the crudest picture.

So unique a stone is one of the most valued of the many rare objects in our Museum.

* "The Kekip-Sesoator or Ancient Sacrificial Stone of the North-west Tribes of Canada," by Jean L'Heureux, M.A., *Jour. Anthropol. Inst.*, Vol. XV, p. 161.

TRURO GRAMMAR SCHOOL,
WITH SOME NOTES ON OTHER OLD CORNISH SCHOOLS.
 BY WALTER H. TREGELLAS.

In gathering materials for a work on distinguished Cornishmen (2 vols., E. Stock, 1884) I was struck with the large number of them who were indebted to the Truro Grammar School for part, if not all, of their education.

This naturally led me to make some investigations into the history of the school, its masters, and some of its pupils; but from the difficulty which I found in pursuing the subject, partly owing to the very scanty leisure at my disposal, I was obliged to rely very much on the account which is given by Polwhele. Nor do I, even now, know where else, except in Nicholas Carlisle's "Concise description of the Endowed Grammar Schools in England and Wales," any printed account of the Truro School is to be met with. The very founder's name is uncertain, and the earliest mention of it is, I believe, in an old election petition, in which it is stated that the school was built by a Walter Borlase, probably about the year 1549, in the reign of Edward VI.* Carlisle, who was assistant librarian to George IV, and a Fellow and Secretary of the Society of Antiquaries, was at considerable pains to investigate this point; as appears from some correspondence which he instituted in the *Gentleman's Magazine* in 1816. But he failed to obtain any distinct information, and was obliged to state in his book that "the Grammar School at Truro owes its origin and endowment to some benevolent person, whose name is not known." But on this point more hereafter. The archives of the Truro Corporation would probably throw some light on the subject, but unfortunately I have neither time or opportunity to consult them.

It is, however, pretty certain that it is not one of those 18 Grammar Schools, the foundation of which shed so much lustre on the reign of Edward VI, and tended in so great a degree to extend and consolidate the Reformed Faith.

* There was an Indenture between the Corporation and Walter Borlase (now lost) for the building of the School. (Journals of House of Commons, 1689).

"In the reign of Elizabeth, under the influence of the Renaissance," says Green, in his "Short History of the English People," "The growth of Grammar Schools was realizing the dream of Sir Thomas More, and bringing the middle classes, from the squire to the petty tradesman, into contact with the masters of Greece and Rome."

Of the other Grammar Schools of Cornwall the following summary of Carlisle's account may be found interesting.

At *Bodmin* the school, which was in the churchyard, was founded by Queen Elizabeth. Its most distinguished pupil appears to have been Humphrey Prideaux, D.D., Dean of Norwich, who received part of his elementary education here; and part also, it is believed, at *Liskeard*. He was the author of several polemical works, the principal of which are "The Old and New Testament connected," and "Directions to Churchwardens for the faithful discharge of their office,"—the foundation of the later well-known work by Charles Greville Prideaux.

The Grammar School at *St. Ives* was founded by a charter of King Charles I, in 1639; Jonathan Toup, born in that town, an eminent classical critic, was one of the pupils. *Launceston* (like *Penryn*, *Saltash*, and *Bodmin*), was another of Queen Elizabeth's foundations. Of *Liskeard*, as of *Truro*, Carlisle writes "there are no records now existing, nor oral tradition, to assign a name to the founder, or a date to its erection. *Liskeard* had no endowment, and the school-room was on the site of the Old Castle; many noblemen and gentlemen of the highest respectability in the north-east part of the county of Cornwall, and the West of Devon, are indebted for their instruction to this Seminary." *Penryn* and *Saltash* each had a small endowment; but neither school, Carlisle says, had been kept up for several years past. There were Free Schools at *Probus* and at *Fowey*. *Helston* too (and perhaps *Launceston*) had a Grammar School. That at *Helston* was rebuilt in 1610; but I have failed to trace the date of its foundation.

Last in alphabetical order, but first in importance, and probably also first in interest, Carlisle mentions *Truro* "the Eton of Cornwall," as it used to be called; his account of which extends to 8 pages. This, however, I do not propose to use any further; but shall, instead, cull from the only available source

at my command, viz: that given by Polwhele, an old Truro Grammar School boy, who was probably one of Carlisle's chief informants.

It should, perhaps, be premised that some trace exists of an early school-master in Truro, a predecessor in occupation, if not in appointment, of that John Hodge who was buried in 1600, and who usually heads the lists of the Masters of the Truro Grammar School. For this information I am indebted to my kinsman, Mr. H. Michell Whitley, who kindly transcribed for me as follows:—

Chantry Certificate of 13 Feb., 4th Edward VI (1550).

"The Towne of Trerewe where are in howse lynge (*i.e.* communicants) people VI^o A Stipendary in the p̄ishe church of Trerewe of the benyvolence of the Mayer and bur̄ges of the said Towne to fynde a p̄st for ever to Mynystir in the p̄ish church and to keep a scole *there*—Sir Richard fosse prest Incumbent and Scolemaster there of the age of 50 yeres hath for his salarye viⁿ xiii^s iiij^d* The lands belonging to the Corporation of the value of ixⁿ with viⁿ xii^s iiij^d for the stipend of the foresaid Incubent and Scolemaster—Ornaments, plate, Jewelles to the same none."†

Now it is well known that, down to the very eve of the Reformation, the education of the better sort was in the hands of the clergy, as it was afterwards, to a considerable extent, in the hands of such fine old Cornish families as the Grenvilles of Stow. "The families of Bishops were the chief seminaries of learning"—and the Bishop himself was originally the chief, if not the only, teacher of his Cathedral School. Hence it is not surprising to find Fosse described as both "prest" and "scole-master," nor to learn that the school at Bodmin was in the churchyard; or to find more than one headmaster of the Truro Grammar School buried in or near the church of St. Mary's. One of the Boscawen family (Hugh), though not a cleric,

* "The last prebend in the Church of Trurowe"—The funds were probably derived from some old Chantry.

† In the roll of fees paid to members of suppressed chantries (2nd and 3rd Mary), the name of Richard Fosse occurs as the "last prebend in the Church of Trurowe" as receiving a pension of £8. In the list of Rectors of St. Mary's, his name comes between those of Nicholas Wenmouth, 1546, and William Dawson, 1588. Fosse was therefore probably the first person who was both Rector of St. Mary's and Head Master of the Truro Grammar School.

gratuitously instructed the youth living near Tregothnan in St. Michael Penkivel churchyard, where Hals, our gossiping Cornish historian, was one of his pupils.—(“Cornish Worthies,” i. 192). Amongst other similar cases, the pious John Evelyn records that he received most of his education in the large porch of the church at Wootton, Surrey, which stands in the family domain.

It seems not unreasonable therefore to suppose that, looking to all these circumstances, the spacious south porch of St. Mary's Church, Truro, may have been the cradle of the Truro Grammar School. The connexion between the Church and the School has always been of an intimate character; some of the incumbents of St. Mary's (as we have seen) have been masters of the School—and a portion of the sacred fabric was allotted to the boys. Moreover, on speech days, a sermon in St. Mary's Church always preceded the elocutionary displays in the School.

It is also interesting to note, from the Chantry Certificate just quoted, how early was the connexion between the Mayor and Burgesses of Truro and the School: a connexion which possibly still exists—the Corporation contributing £25 per annum to the school revenues.

But it is time to consider Polwhele's account, which also incidentally affords some pleasant peeps at old Truro, and is in that writer's own characteristic, diffuse method. To condense what he says:—The free-school at Truro is reported to have been founded by one of the Borlases, for the express purpose of classic education. In 1730, as appears by the inscription over the master's seat, the northern part of the present school-room was built. At that time, there was a dwelling house appropriated to the master, contiguous to the school, and *in a line* (?) with the other houses in the street.* This was pulled down to enlarge the school-room in 1731; hence the necessity of the two pillars in the middle of it, which stand where the south (? north) wall of the first erection stood. The pillars and pilasters in the schoolroom are of the Corinthian order; the dimensions of the room are 46 feet by 32 without, and 42 by 28 within; the height within, to the moulding, 12 feet 8 inches; to the top of the ceiling 18 feet 6 inches. The library is 11 feet by 11 feet.

* In 1729, an order was issued by the Mayor of Truro, that the wall dividing the School premises from those of Wm. Hallamore is to be taken down, and a new School-house built.

The area in front of the school is 30 feet by 13. The lower backlet 47 feet by 30. The passage between them 48 feet by 9.*

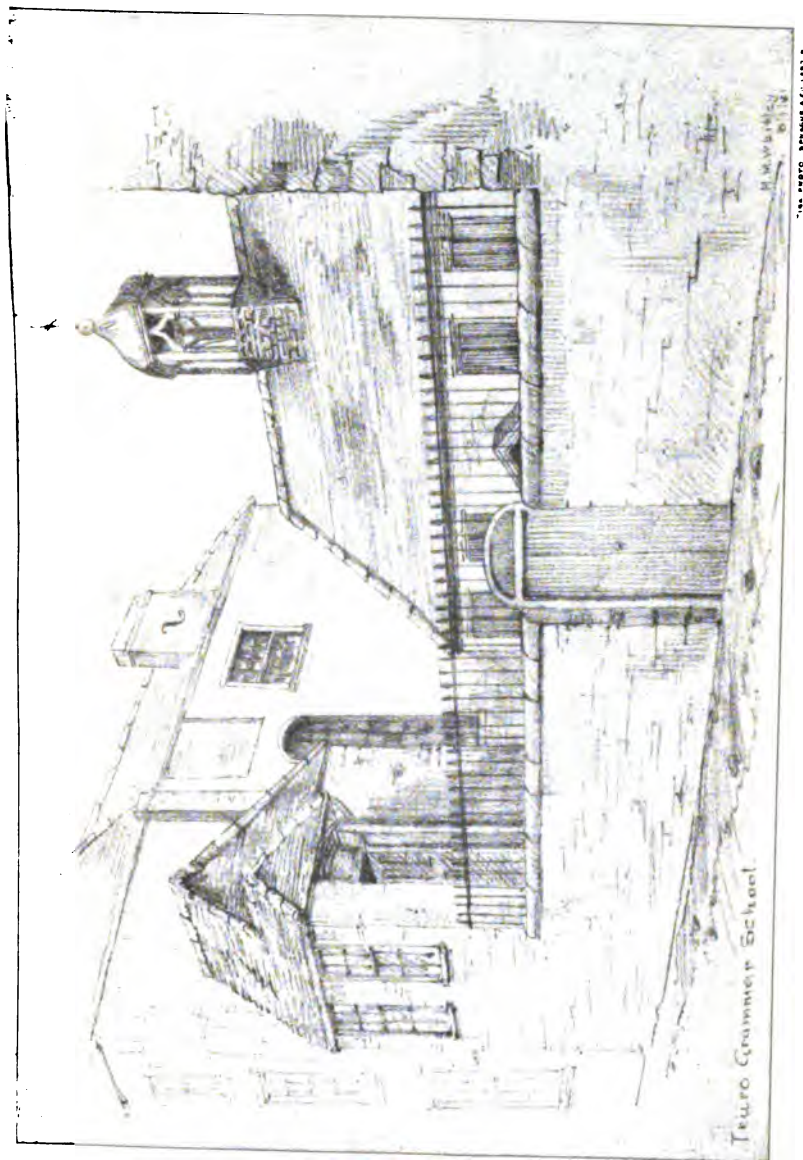
Unfortunately (in Polwhele's opinion), and much to the detriment of Conon's successors as head masters, Mr. Conon consented to receive ten pounds per annum in lieu of a house which the Corporation would have provided for him. This sum, with the original endowment of fifteen pounds, was all that Dr. Cardew, a succeeding headmaster, ever received from the Corporation,—but the patrons, or representatives of the borough, for some years contributed twenty-five pounds per annum towards the support of an usher.

Whilst the masters lived on the spot, the play-place at the back of the school was a garden. And there was a tradition that what is now known as The Green (the bowling green) was once allotted as a play-place for the use of the boys of the Truro Grammar School. The writer remembers joining with other old Truro Grammar School boys in a somewhat violent assertion of this supposed right.

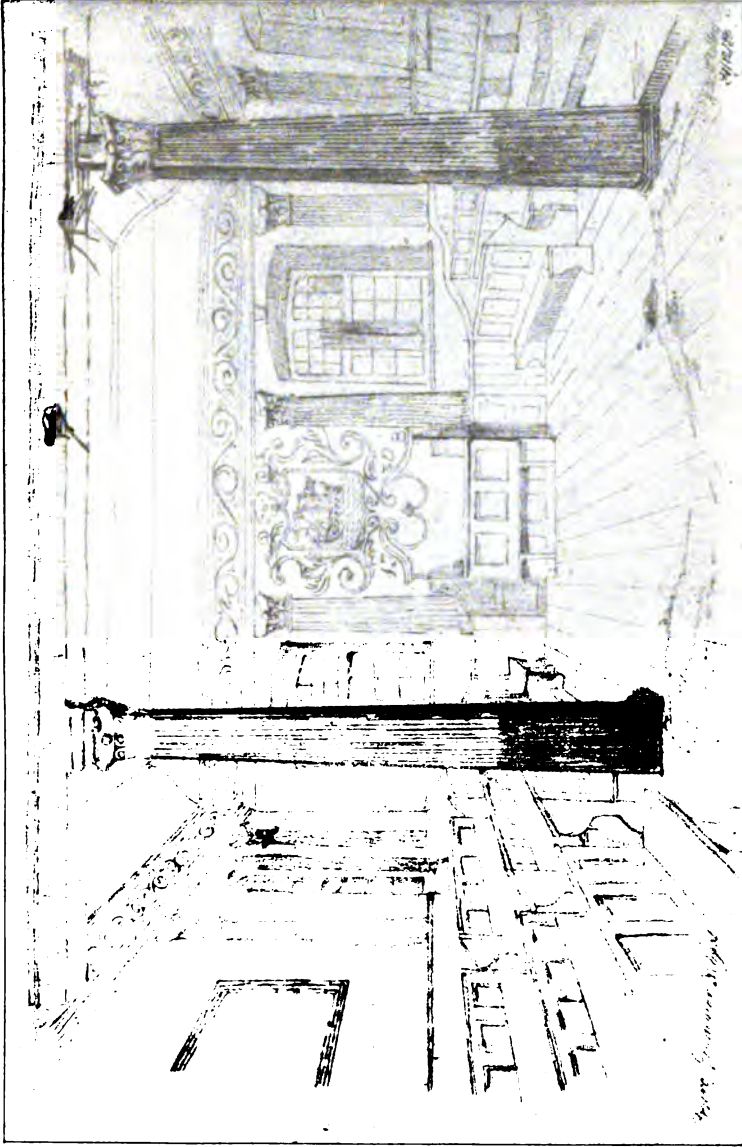
"This tradition," says Polwhele, "I had often heard, as well as my schoolfellows: and often had we acted upon it, entering the green with confidence, and looking on the bowlers as usurpers of our right; but I did not then know that my own family were once in possession of the bowling-green. Among my old papers I lately met with the following letter, superscribed, "Bro. Franc. aboute Trurowe greene." In this letter, dated June the first, 1642, Francis Polwhele thus addresses his lovinge brother, John Polwhele, Esq., at his chambers in Lincoln's Inn.—

"Good brother * * * * The materialls are in place for the new building of the decaied houses on the greene. I have priuately conferred with divers ould people; most tell me, they have known it a sporting-place; and some have heard it accounted Polwhele's land. All agree they remember the greatest part taken from the sea by the towne. You may take this into consideration. 'Tis of value, and noe reason that what is taken from the sea, and your's, should be their's. You may,

* See the exterior and interior views of the School which accompany this article.



TRURO GRAMMAR SCHOOL.
(From a Pencil Sketch by Mr. H. Michell Whitley.)



TRURO GRAMMAR SCHOOL.
(From a Pencil Sketch by Mr. H. Whitley.)

1. The first part of the document is a list of names and dates, which appears to be a record of some kind. The names are written in a cursive script, and the dates are in a more formal, printed style. The list is organized into two columns, with names on the left and dates on the right. The names are: John Smith, James Brown, and William Jones. The dates are: 1810, 1811, and 1812. The list is followed by a section of text that is also written in cursive. This text appears to be a description of the events that took place during the period covered by the list. It mentions the names of the individuals listed and describes their actions and the circumstances surrounding them. The text is written in a clear, legible hand, and it provides a detailed account of the events. The final part of the document is a section of text that is also written in cursive. This text appears to be a summary or conclusion of the events described in the previous section. It mentions the names of the individuals and describes the overall outcome of the events. The text is written in a clear, legible hand, and it provides a concise summary of the events.

by Jo. Spring's means, who is Jo. Michell's friend, know whether he had any deeds with the purchase of the Marsh from my grandfa' that express the boundary.

Your most loving brother,

FRANCIS POLWHELE.

To return to the School itself, there were two exhibitions belonging to it, arising from the effects of the Rev. St. John Eliot, Rector of St. Mary's, Truro (from 1745 to 1770) and of Ladock, who, by will left the greater part of his property to Messrs. Conon, Vivian, and Michell, to be disposed of in charitable uses, at their discretion. This property was invested in the public funds, and the remainder, after the exhibitions were paid, supported six "reading-schools,"—not only in Truro, but also at St. Agnes, Ladock, Padstow, Lostwithiel, and Liskeard. The trustees are said to have been the Rector and Schoolmaster of Truro, and the Vicars of Kenwyn, St. Gluvias, and Veryan.

The exhibitions were each worth thirty pounds a year; the qualifications, that the candidate should have spent the last three years at Truro School; that he entered at Exeter College, Oxford; and that he kept three terms there in every year. They were held for 4 years; and for 7 years if no candidate presented himself at the end of the four.

The school, for a long series of years, was of a high character, and might have been classed amongst the first seminaries of England, excepting Westminster, Eton and Winchester; indeed, its masters and scholars were frequently formidable rivals to those of the royal foundations, in genius, taste, and learning. The masters, often, as we have seen, Rectors of Truro, and also members of the Corporation, were almost uniformly men of ability and position.

Amongst others Polwhele mentions, *Henry Grenfield*, schoolmaster in 1685, and one of the corporate body; adding that he was, of the house of Stow, and that the Grenvilles varied the spelling of their names from Granville even to Grenfell and Grenfield.*

Of *Simon Pagett* (both Rector and Master) "the memorial existed" among the natives of Truro.

* For further variations see the writer's "Cornish Worthies," Vol. ii, p. 6.

Mr. Jane (Rector also as well as Master) had a son who was student of Christ Church, Oxford; and who at his death, left several Hebrew books for the use of the rectors of St. Mary's. It would be interesting to know what became of this old library.*

A chronological list of the masters of the Grammar School in Truro is appended. (We have already heard of Richard Fosse in 1547).

1600. *John Hodge* (buried 15th October, 1600).

1609. *Thomas Syms* (buried 28th June, 1609).

1612. *Matthew Sharrook*, of Vryan. His salary from the Corporation was £10 a year.

1618. *Nicholas Upcott*, of St. Austell.

1620. *George Phippen* (or Fitz-pen), Rector and Preacher, who was buried in St. Mary's in 1624. (There was a monumental slab to the memory of an Owen Fitz-pen in old St. Mary's church.)

1635. *William White* (Nov. 17).

1666. *Richard Jago*. In September, 1685, this master was "dismissed, and ordered to surrender the school-house and all houses." (Carlisle).

1685. *Henry Grenfield* (Sep. 9th) an account of him is given by Hals; and also in the R. I. C. Journal for 1870, p. 317. (See also "Cornish Worthies," vol. ii, p. 37).

1693. *Simon Pagett* (Dec. 21st), Rector of St. Mary's, Truro.

1698. *John Hilman* (1693 to 1711). Dec. 16.

1706. *Thomas Hankyn* (or Hunkin), Oct. 9th. Buried 20th October, 1714.

In 1879, a slab was found, face downward, buried outside the chancel in Truro Church. Christian name illegible. Surname, *Hunkin*—a head master of the Truro Grammar School, date 1714.

"Here now he sleeps who taught and acted true
Gramer and vertue (Truro youth) to you
Let your faire copies of his honesty
Be your dead master's living elegy."

Joseph Jane (Buried Nov. 19th, 1745) Rector of St. Mary's, Truro, 1711 to 1745.

*The old School library is now, it is believed, kept in the Corporation Muniment Room, in the Town Hall,

1748. *George Conon* (Feb. 25). Resigned 1771.

Cornelius Cardew, D.D., &c., (15th July, 1771). Resigned 19th July, 1805.

A list of subsequent masters is added, which I have completed to date.

1805. May 23rd, *Thomas Hogg*.

1829. Feb., *Dr. John Ryall*.

1837. Nov. 15th, *Osborn John Tancock, D.C.L.* Resigned Dec., 1848.

1848. Dec., *A. J. W. Morrison, M.A.* Resigned June, 1852.

1852. June 3rd, *Samuel Andrew, M.A.* Resigned Michaelmas, 1855.

1855. July 9th, *Charles Durnford Newman, M.A.*, who removed his scholars to Fairmantle Street in 1860. Resigned at Christmas, 1866.

1866. Dec. 27th, *George Henry Whitaker, M.A.*

1874-6. *Braithwaite Arnett*.

1877-8. *Fred. Millard*.

1878. *Lewis Evans, M.A.* Resigned 1886.*

1886. *Mr. Edward Luxmoore, M.A.* (the present master, 1891), who conducts the school as a private undertaking.

Of the last two masters (*Conon* and *Cardew*) mentioned by Polwhele, he says "I can speak from personal experience. Both my father and myself were instructed in the principles of religion and the elements of the Greek and Latin tongues, under George Conon, a Scotchman; a sound grammarian, a Christian, firm in belief, and punctual in practice. He was once (I have heard) an usher at Westminster: at Truro, he was a second Busby. He flogged like Busby, and like Busby taught. We feared him; but we loved him. And when, from the infirmities of old age, he was forced to relinquish his charge, we all regretted his departure, with tears; nor were they, though the tears of childhood, "forgot as soon as shed." Mr. Conon, appointed to Truro School Feb. 25th, 1748-9, resigned it July 15th, 1771, to the *Rev. Cornelius Cardew*, and retired to Padstow, where he continued to keep a school, having taken several of his old scholars with him. There he died, on 27th May, 1775, a bachelor, leaving the bulk of his savings to a Mr. Burnet. His epitaph,

* In 1880 the School was removed to Tregolls, and the old premises were sold in 1887.

written by Mr. Burnet, and engraved on a plain stone, in Padstow churchyard, runs thus :—

“ In spe beatæ resurrectionis,
Hic jacet sepultus, Georgius Conon, A.M.
Nuper apud Truronenses, novissimè vero in hoc vico,
Humanarum Litterarum, Preceptor ;
Præ multis eruditus, diligens et felix—
Vir priscae virtutis, et Christianæ pietatis in homines Exemplar,
Et idem propagator eximius—Vitâ jam Christo patriæque impensâ
piam animam efflavit vi Cal. Junii 1776,
Ætatis Suse 74.

—o—
Beati qui moriuntur in Domino.

On his successor, *Dr. Cardew*, Polwhele says that “the praises which candour, or even indifference would bestow, may, as coming from his pupil and his friend, be attributed to partial affection. But, to be suspected of an amiable prepossession shall not silence gratitude ; which, though perhaps too lively in its perception of merit, can never be mistaken, where merit is *universally* acknowledged. A native of Liskeard, and educated under the care of the Rev. Richard Hayden, M.A., rector of Okeford, and of Zeal-Monachorum, in Devon ; and of Mr. John Lyne, Rector of St. Ives, Mr. Cardew carried with him, to Exeter College, Oxford, those promises of a useful life which were amply fulfilled in the discharge of his professional duties.—At first an usher under Mr. Marshall at Exeter School, he came to Truro, with high recommendations from persons of respectability, both in Oxford and at Exeter. And, with classical abilities and taste (to which Mr. Conon, though an excellent linguist, had no pretensions) he succeeded to the care of no more than twenty-seven boys. With that cultivated and refined understanding which naturally gives the preference to genius, he never remitted his attention to the dullest boys ; and, though quick and susceptible, he had full command of his temper. That he acted as a magistrate with equal credit to himself and his connections is not so decided an opinion. But if, in some instances, his conduct as a member of the Corporation of Truro, may have incurred disapprobation, it was the disapprobation of those who viewed the transactions of the borough with an eye of prejudice. And chiefly to this circumstance was owing the decline of Truro School. Yet even those who thought differently from himself, never accused him of inconsistency. His first

living, that of Uny Lelant, was a sufficient proof of the favour of his diocesan. And the rectory of St. Erme, to which he was afterwards presented by Dr. Wynne, did equal honour to them both. Dr. Cardew married twice, first to Miss Brutton, of Exeter; and secondly to Miss Warren of Truro; he was the father of a numerous family, a great part of whom he placed in respectable situations; and, possessor of a considerable fortune, for the acquisition of which he had to thank himself only, he retired to his Rectory. Till within the last ten or twelve years of his long reign Dr. Cardew received the old price of schooling, only two guineas a year! On the 19th of July, 1805, Dr. Cardew resigned his school. In gratitude to their old master, his scholars entered into a unanimous resolution to present him with a silver service. He left a sum to provide a valuable set of books to be competed for by the scholars annually."

Mr. Hogg, a layman from Scotland, who had been elected his successor, was next invested with the "magisterial ensigns." In Flindell's paper (now The Royal Cornwall Gazette) appeared on this occasion an advertisement, worth looking at, but for which we have no space.

In a list of the boys educated at Truro School, whilst Mr. Conon undertook its superintendence, Polwhele found, amongst others, the names of William Veal, Samuel Enys, James Tonkin, Swete Nicholas Archer, Edward Goodere Foote, William Tonkin, Junr., Edmund Donnithorne, Humphrey Praed, Henry Foote, Edmund Prideaux, Charles Osler Prideaux, Joseph Hussey, Benjamin Prideaux, Henry Usticke, John Trewan, William Lemon (father of the first Sir William) Addis Archer, Thomas Vivian late of Cornwood, Nicholas Archer, Bulkeley Mackworth Praed, Richard Hill, Jackman Foot, Richard Spry (the Admiral, I believe) John Foot, Samuel Foote, Edward Archer, Philip and Francis Sperton, Edward Giddy, Stephen Tippet, Thomas Polwhele (father of the Rev. Richard) and Thomas Hawkins. The list contains only 129 names, and the last is that of Edward Bishop; but there are no dates of the time of their entrance.

Polwhele proceeds to give some short notices of the following pupils, *Humphrey Mackworth Praed* of Trevethoe. *Samuel Foote*, the comedian, who always begged for a holiday for the

boys whenever he revisited Truro. The *Rev. Edward Giddy* of Tredrea (father of *Davies Giddy*, M.P. for Helston, afterwards *Davies Gilbert*, P.R.S.)

The *Rev. Dr. Andrew*, who was a Fellow of Exeter College, Oct 1741, and Prebendary of Rochester, 1765-1775, was born in the parish of Probus.

General Macarmick another old pupil, Governor of Cape Breton, who used to give annually three silver medals to those "young gentlemen" who excel in public elocution*. At the anniversary of the School meeting, the prizes were assigned by two stewards, the chaplain, and two gentlemen chosen as assistants.

Colonel Lemon, *Sir Edward Pellew, Bart.*, the gallant naval hero, *Viscount Exmouth*; *Hops Williams*, *Gregor of Trewarthenick*, M.P. for Cornwall, and *Francis Jenkins*, the worthy vicar of St. Clements, all of whom did honour to Truro School. "*Solicitor Vivian*," learned in law, was educated here; also *John Arthur*, vicar of Little Colan; *Pascoe Grenfell, M.P.*, to whom Cornwall "looked up, as to one of her first men." Others of the *Grenfell* family also went to Truro School. Then come the *Carlyons*—*John Carlyon*, attorney-at-law, of St. Austell; *Thomas Carlyon*, late fellow of Pembroke Hall, Cambridge, and Rector of St. Mary's, Truro; and *Clement Carlyon*, afterwards a physician at Truro, and thrice Mayor of the old town.

Kempthorne, son of Admiral *Kempthorne*, of Helston; *Henry Martyn*, *Joseph Hallet Batten*, fellow of Trinity College, Cambridge.

Gregor, *Carlyon*, *Kempthorne*, *Martyn*, and *Batten* all distinguished themselves in mathematics, at Cambridge, though educated in a purely classical school. (It would be invidious, Polwhele thought, to mark their exact places in the lists of Senior Optimes and Wranglers)† The *Rev. Tregenna Biddulph*, a Cornish author; *Humphry Davy*, professor of chemistry in the Royal

* General Macarmick established the medals in 1787, when he was M.P. for Truro. I had been unable to obtain a description of these medals, or any notice of their inscriptions, but have at last found a description of them in Mr. G. C. Boase's valuable "Collectanea Cornubiensia," (1890). Medals were subsequently presented by the Earl of Falmouth; of which the writer was so fortunate as to gain two.

† As a matter of fact both *Kempthorne* and *Martyn* were senior wranglers of their respective years.

Institution, a man of extraordinary genius (as Polwhele rightly considered him) and a very conspicuous character.

Other distinguished pupils were *Francois Gregor, M.P.*, of Trewarthenick, author of several political tracts; *Fortescue Hitchins*, author of a History of Cornwall; *Francois Hingeston*, author of a small volume of charming poems; *Dr. John Cole*, rector of Exeter College; the *Rev. Edward Scobell*, author of a volume of sermons; the *Rev. Thomas Vivian*, of Comprigney, also an author; his son *John Vivian*, vice-warden of the stannaries; and his illustrious grandson, *Richard Hussey Vivian*, first Baron Vivian of Glyn and Truro, who "led the last charge at Waterloo;" and one might add that amongst other distinguished pupils was Polwhele himself.

To come down to later times, the late Bishop Colenso, (with others not unknown to fame), was a pupil at the Truro Grammar School.

At the time when it was not unfashionable to send "young gentlemen" to the University, direct from a country school, Cornwall saw her scholars both at Oxford and at Cambridge, said to have been possessed of more sound learning than some of those who "made their boast of royal seminaries."

The number of scholars in the most flourishing times scarcely reached one hundred; there is a rumour that Mr. Conon had once 99 boys, but could never attain to one hundred. Dr. Cardew's highest number was about 90; he used to consider sixty as the average, and in the least prosperous times these were seldom reduced to 40. Yet the numbers were very low at the time of Dr. Cardew's resignation, from several causes, combined with that already stated, but none of these were by any means injurious to the Master's reputation; and it is gratifying to record that the attendance at the anniversary school-meeting, on every second Thursday in September was not less than in former years. On these occasions gentlemen educated at Truro Grammar School were formerly accustomed to attend at the school-room, at 11 o'clock in the forenoon, and to proceed thence to church, where an appropriate sermon was preached, if possible (and generally) by an old boy. After divine service a select number of the boys declaimed in the

school-room, for the prize medals already referred to. The company then adjourned, and dined, at about three o'clock, at the King's-head—(Was this the Inn now known as the Red Lion? or was it in the old Powder Street, now removed?).

The Declamation Bill for 1806, is reprinted in extenso by Polwhele, "verbatim et literatim."

R. Broad, F. Thomas, F. Jenkins, T. Powell, C. W. Turner, W. Treleaven, J. T. Nankivell, W. Richards, E. Turner, and J. Trestrail, were the youthful orators; and the "umpires" were

Jacobus Plomer, Armig. } Arbitri.
Clem. Carlyon, Med. Doct. }

The latter part of the foregoing observations is a much condensed account of what Carlisle and Polwhele say of this interesting old School; and it appears worthy of resuscitation, if for no other reason than the scarcity and incompleteness of copies of Polwhele's works; and because Carlisle seems to be so little known.

Two or three further points of interest occur to me in connexion with the subject.

1st. Do there exist any examples of General Macarmick's medals? I have sought for one in vain. If one could be procured, I would suggest that it would be well to engrave it for the pages of the R. I. C. Journal.

2nd. Most of the benches and desks in the school have the names of former pupils cut on them. I think I remember amongst others, the names of Colenso, Edward Pellew, and Clement Carlyon. Could not these be preserved,—though the dear old school has now become an ironmonger's warehouse,—perhaps in the R.I.C. Museum? Cutting of names was at Truro Grammar School, as elsewhere, a great, because a forbidden, pleasure; and it was accordingly the ambition of some little boys to be able to say that they had cut their names or initials on *every bench* in the school. One boy succeeded in doing this,—many a punishment notwithstanding. I seem almost afraid, even now, after the lapse of nearly half-a-century, to divulge his *name* (for he has done little else to distinguish himself) but his initials were—

W. H. T.

THE ANNUAL EXCURSION, 1890.

The following account is abridged from that which appeared in the "Royal Cornwall Gazette."

The Annual Excursion took place on Thursday, September 4th. The company assembled at the Town Quay, Truro, and embarked on the 'New Resolute,' which left just before ten o'clock for the Helford River, calling at Falmouth. On leaving the harbour and passing out into the open sea a south-westerly course was taken, and after an hour's run, the steamer entered Helford River.

The approach of the steamer was signalled by a flag being run up to the top of the flagstaff on the tower of Bosahan. The magnificence of Helford River was much admired, its noble breath, its guard of two old Roman forts on Dennis Head, one afterwards used by the Royalists in Cromwellian times, and the peaceful sanctuary of Mawnan on the other side of the river. Beyond Mawnan, in a little nook, was Durgan. "One of the warmest spots in Cornwall, and most suitable for a health resort," was written on a map of the district, prepared by Mr. Whitley, for the use of the excursionists. Further up the river was the ferry with the houses of the coastguardsmen streaked in white. On the left, in a most commanding position, was Bosahan, to visit which, Mr. A. Pendarves Vivian, a former president of the Institution, had most cordially invited the members. A landing was effected at Bosahan beach, and the party were met by Mr. Vivian, who personally conducted them along most beautiful paths cut through an uprising coombe full of well-grown timber, ferns, and undergrowth of indigenous plants; passing through a little gate, these gave way to Australian and other tropical plants which Mr. Vivian had collected in many of his voyages abroad. A gum tree (*Eucalyptus*), one of the giant trees of the Australian forests, forty-feet high and of only four years' growth, was much admired. Higher came a path of cryptogams, and in a sort of crater rockery grew maidenhair and other ferns, brought from Teneriffe, and a tree-fern grew a little beyond. On approaching the house Lady Jane Vivian extended a cordial welcome to the visitors.

A little time was spent on the lawn admiring the many old-fashioned flowers that were cultivated around the house or clung to its walls, or taking in the magnificent view of sea and coast. The views from Bosahan are something exceptional as regards beauty, especially on a day like the one enjoyed by the Institution; the river, Mawnan chair, Rosemullion Head, Pendennis Castle, St. Anthony, the Dodman, to which the excursion was last year, and Rame Head, white in the bright sunshine, were visible at once. A capital luncheon was next partaken of under a marquee erected on the lawn, provided through the liberality of Mr. Vivian. Ample justice being done to the repast, an inspection of the house was made under the personal guidance of the host. In a word, the house is a museum, in which everything has been acquired by Mr. Vivian; the history of everything in it being known to himself.

Bosahan, situate within six miles of Falmouth, and half-a-mile from Helford Passage, formerly belonged to Mr. Humphrey Grylls, who died in 1834. The present owner, Mr. A. Pendarves Vivian, came into possession of it in 1882, and shortly after erected the handsome mansion which is now known as Bosahan. The estate consists of 460 acres, and is situate in the parish of St. Anthony. The mansion is one of the finest in Cornwall, in style Elizabethan. It covers an area, exclusive of the outbuildings, stables, &c., of 21,760 feet. It is built of stone quarried on the spot, the mullions and dressings consisting of Doultling stone from Somersetshire. Beyond the vestibules is a magnificent great hall, fifty feet long and twenty-two feet wide. The floor is of oak from Adair House, St. James's square, now the Junior Carlton Club. The entrance to the apartment faces a large twenty-six light window, numerous crests and arms in stained glass, the Cornish arms, the Cornish chough and motto, occupying a prominent position. The magnificent mantelpiece, fourteen feet long and over nine feet high, was carved at Verona, especially for the hall, which is panelled by collections of old arms, &c., and the heads of many animals of the owner's own killing.

The massive roof is supported by splendidly carved corbels and the roof is said to consist of no less than 2,550 cubic feet of oak, weighing more than three tons, while each of the three principals of the roof weighs three tons. The large billiard room

contains a handsome Italian walnut mantelpiece of Verona carving; cases of birds decorate the walls, and the ceiling is a copy of that at Knowle House, Kent. The spacious library has a mantle of the Louis XVI. style, of Sienna marble, beautifully carved, and from this apartment a door opens into the palatial drawing-room, whence a lovely view is obtained. Here, also, the pure white statuary marble mantelpiece, from Brussels, is of Louis XVI. style, the door and window fittings, and hearth being from Lord Stair's old house. The ceiling is copied from one at Crewe Hall.

The dining room is on the opposite side of the great hall. The fireplace is from the house of the Earl of Stair, the beautifully carved wood, painted white, being lined with Poltisko serpentine. The side tables are Italian with marble slabs; the ornaments of French bronze. An old English Sherraton sideboard is a piece of conspicuous furniture here, and the electric fittings are almost all of bronze.

Twenty-one of the doors are beautifully carved, and were brought from an old manor house in Nottinghamshire.

On the top flat is a curious old bell, which was in the old house. The view from the tower is extensive, embracing St. Keverne, Mabe, Mawnan, Constantine, and Budock church towers, Tregothnan (Lord Falmouth's seat), and other notable places.

The first portion of the vestibule is paved with Devonshire marble, the second, rising up two steps, with serpentine; beyond is the noble hall, built expressly for a museum, and full of objects arranged with admirable taste. The display of arms there, is the more interesting, as it blended those of the olden times with the newest forms, the blunderbuss, the snider, and others.

The gallery of the hall is supported by wrought iron pillars. The several noble pieces of tapestry on the walls are Flemish, and depict the deeds of a general going on a campaign; his victories; his offerings to his emperor, and the blessings of the church. Between are mounted heads of wapiti and red deer, and moose shot by Mr. Vivian. Passing into the billiard room, the windows of which command a beautiful view of land and

sea, Mr. Vivian's collection of birds, most tastefully stuffed and displayed, minerals and metallurgical specimens were inspected: on returning through the great hall, an inspection of several other rooms was made.

After examining many objects of interest in the gun room, Major Parkyn, the hon. sec., called upon Mr. H. M. Jeffery, F.R.S., to propose the vote of thanks to the host and hostess for their kindness that day. Mr. Jeffery, in response, said: the duty that devolves on myself as one of the vice-presidents, is to propose "that the thanks of this Institution be given to yourself and Lady Jane for the hospitality outside, and the beautiful things you have shown us in this house." Six years since we were kindly entertained by the Earl of Mount-Edgcumbe, at Cotehele, just as you have yourself entertained us to-day; he explained everything, and now we carry the parallel further; on the present occasion you, Mr. Vivian, are equally familiar with everything that concerns your magnificent house. I should like to mention, that during your term of office as President of this Institution, you wished to see the carrying out of the extension of the premises, so that more might be benefitted; that extension you will be pleased to hear is now being carried out, if not in the letter at least in the spirit, by the able curator (Mr. Crowther), who has been appointed by the Council. He has taught classes in science in the mining district during the past winter, and intends to have classes within the Institute itself this winter. On behalf of the members of this Institution, I have the greatest pleasure in proposing this vote of thanks to yourself and Lady Jane Vivian.

Mr. Vivian, in reply, expressed the pleasure it had been to himself and to Lady Jane to receive the visitors, and said, we have done our best to make our home pleasing. With Cotehele, one of the most interesting houses in the whole county, we do not dare to compete. This house has been made these last few years, and has been done or is being done by one's self. One cannot make everyone feel the interest which is associated with this house; this belongs to one's self. I should have liked to have personally shown you the minerals and many other things. We are glad to meet you here, so far out of the beaten track, and hope you will have a fortuitous return home, and we are happy in showing anything we may possess of interest to you.

A walk across the fields led to Manaccan, after visiting the church, the party went down the hill to Tregonwell mill, where Manaccanite, an oxide of titanium, was discovered by the Rev. Mr. Gregor in 1791. Of the uses of titanium, and its admixture with soda in the arts for rendering muslin unflammable, Mr. Crowther gave an account, besides exhibiting a specimen.

The ancient name of the old parish of Manaccan, of which the Rev. A. R. Eagar is the new vicar, was Minster, Saxon for monastery. Since 1521 the parish has been called Manach-an (interpretation—in Cornish—being monks). Both names imply the previous existence of a monastery there. The great tithes were bestowed on Glasney College by its founder, Walter Bronescombe, Bishop of Exeter, August, 1275, towards the maintenance of two chaplains, to celebrate a mass daily in the Lady chapel, for the souls of the founders. But the great tithes of Trevoze and Treath still belong to the vicar, so the titular Manaccan is a vicarage, but technically a rectory. The Bishops of Exeter had until lately, in the parish, a small tenement, possibly outlying the manor of Penwyn Toirian, it extended to Helford river. An old family was that of Kestell, of Kestell Barton, and their monument is in the south side of the church. The arms are founded on the rebus, or three castles gules. Interesting features in the church were the hagnioscope, and carved wood let in the wall, removed from an oratory in St. Anthony. The church has a Norman doorway. A fig tree, said to be 200 years old, grows out of the south wall, the tree bears fruit every year, but it does not come to perfection. Celebrities of the parish of Manaccan include the Rev. R. Polwhele, poet, historian, and divine; also, Houghton and Budge, who are buried there.

From Manaccan a short walk led to Helford village, where the party went on board the steamer; after waiting for a detachment of the company, who had gone round by Dennis Head, St. Anthony's Church, and up Durra Creek, anchor was weighed. The return home up the River Fal was most agreeable, and about eight o'clock a landing was effected on the Truro quay. After expressing their thanks to Major Parkyn, the hon. sec., for the

agreeable day spent, and the opportunity of partaking in what had been one of the most pleasant excursions spent by the Institution, the party dispersed.

NOTES AND QUERIES.

The Editor will be glad to receive short Notes on Discoveries, and occurrences of interest, relating to the Antiquities, Geology, and Natural History, &c., of the County, for insertion in this portion of the Journal.

No. 1.

The Dollar Ship of Gunwallo.

Mr. John Johns of the Lizard writes as follows to Mr. W. H. Tregellas with reference to the above.

The story of the wreck of the Dollar Ship has been repeated to me several times, by two different men I knew well, when I was a boy, who said the ship containing dollars was chased by a Pirate, and came to misfortune by a fog. At the time of the wreck a large quantity of dollars were said to have been washed ashore and picked up.

I remember the miners sinking a shaft and driving an adit into the shaft, the shaft not being so deep as the adit; by entering the shaft, they cut a hole about 6 inches in diameter down to meet the adit, thinking the dollars would be forced up through this hole into the shaft, and in cleaning out the shaft dollars were found, not many at a time. They are supposed to be amalgamated and not easily separated from the main bulk. It was reported at the time that there were fourteen tons of dollars besides doubloons in the ship.

No doubt the pirates knew that she was rich, and chased her for the purpose of enriching themselves. Dollars have been picked up from time to time, especially when the wind has been blowing some time from the westward, and then the sand goes out against the wind and the heavy sea cleans out the place from sand and pebbles. The dollars have been seen all clear of the sand, but no getting at them, as the sea rushes over the outside rocks too strong for any one to venture near the shore,

and when the sea rages with a ground sea from the westward with an easterly wind, the sand comes in and covers the rocks which then brings in any dollars that have been loosened by the force of the sea acting on the boulders, and so knocking them all manner of ways, and driving them between the crevices of the rocks. I well remember having had five dollars put into my hand by a hawker at one time. These were taken as payment for goods by him near to the wreck.

The next party that tried was from Liskeard, who built a breakwater outside all, intending to clear out the pit where the ship broke up. They had 18 weeks easterly wind at the time, and the breakwater was nearly completed, but a ground sea destroyed all their labour, and it was all a failure. I passed over the cove at Gunwallo next day, and everything was washed away from the place and came ashore, baulks of timber, iron cramped, and spars; the cove was nearly filled with the materials from the breakwater. The loss to the adventurers was said to be £1,000 for their search. Since then many dollars have been picked up. A further attempt was made by employing a steam engine on the spot, and trying to pump up the dollars, but this also failed.

No. 2.

Frescoes in Linkinhorne Church.

The *Western Morning News* of August 8th, 1890, contains the following interesting account of the frescoes discovered during the recent restoration.

The restoration of this church, which has been undertaken by the vicar, the Rev. W. H. Poland and a committee of parishioners, is making satisfactory progress under the direction of Messrs. Hine and Odgers, the architects, and it is hoped the work will be completed in October. A few months ago the interior of the building presented a most desolate and unpromising appearance, with walls, roofs, pillars, and arches covered with whitewash, and scarcely a fragment of carved work or colour to relieve the dreary waste. Since then all the white lime has been removed and the masonry cleaned, repaired, and pointed. Here, as in so many churches of Cornwall and Devon,

it is found that the earlier work is in freestone, and the later in granite. The south aisle, erected about 1380, is built in the easily-worked local stone of Pengelly; the north aisle, and tower, erected by Sir Henry Trecarrel early in the 16th century, are of granite, chiefly in large blocks.

A weird interest attaches to Trecarrel's Church work, in which alone he found consolation on the break up of his family and home; but even more attractive is the 14th century work in the south aisle, not only because in regard to time (as in other respects) "distance lends enchantment," but because the earlier work includes a fuller history. In peeling off the layers of white lime from the south wall, portions of texts, in old black letters, surrounded by scrolls, were noticed, and below these again indications of coloured figures; and on a careful and complete removal of these outer surfaces a life-size figure of our Lord was disclosed, with groups of smaller figures at each side and beneath his feet, representing the seven acts of mercy—to give food to the hungry, drink to the thirsty, clothing to the naked, harbour to the homeless, to visit the sick, to minister to prisoners, to "*berry* (the) *ded*." The groups with the words on labels above are imperfect, and have not yet been fully identified. The act of clothing and that of visiting prisoners seem to be included in one picture. The legends appear to be all in English. The dispenser of mercy in every act (excepting the last, in which a priest with a tonsure appears), is a woman in the dress of an abbess, with a peculiar bag at her waist, sometimes called a "gipsy bag."

The figure of Our Lord, under a canopy or tent, against a diapered background, is finely outlined. He is represented with a nimbus (enclosing a cross) surrounding His head, and with wounded side, hands, and feet. His bleeding hands are uplifted as if in blessing ("Ye have done it unto me"), and the symbolical treatment of the subject throughout is of much interest.

The fresco (for such, no doubt, it is, although executed on only a thin coat of plaster, and in a manner very different to Italian frescoes), is probably only one of a series which occupied the spaces between the door and window openings of the south aisle, indeed further west is a portion of another painting, the

subject of which has not yet been made out, and which was covered by the post Reformation lettering alluded to. The words "King James" probably fixed the exact period of this latter treatment. There can be little doubt that the frescoes are of the same date as the aisle itself (circa 1380), and that they are on the original plastered surfaces of the masonry. The usual plastering of that time was a mere skin. In this case it is nowhere more than a quarter of an inch thick, including an undercoat of sand and lime to make up any unevenness of surface in the wall. Over this is a thin coat of almost pure carbonite of lime, on which, whilst wet, the artist must have worked. The colours he used were chiefly earths—red ochre, siena, green, and cobalt.

It is not a little striking that, besides the fabric itself, the only remains of mediæval art left in this church are a head of the Saviour in the glazing of a window which is in the line of the Rood, and close by this remarkable and beautiful fresco, with its lesson of mercy by His merits; that same lesson which Shakspeare re-echoes in the "Merchant of Venice"—"In the course of justice none of us should see salvation. We do pray for mercy; and that same prayer doth teach us all to render the deeds of mercy."

Although the fresco of the seven acts has been hidden for nearly three centuries, it has been scarcely a forgotten dream in the minds of the parishioners. A sort of tradition of it seems to have been handed down from one generation to another, as indicated by some unusual epitaphs in the church and churchyard. On a slab in the south porch the virtues of *Mrs. Elizabeth Phillips*, who died in 1769, are thus recorded:—

"While here on earth
A pious life she led,
She cloth'd the naked,
And the hungry fed,
Each Christian precept
Early did profess,
Was friend to widows
And the fatherless."

It is almost needless to say that the remarkable "find" at Linkinhorne will be most carefully protected from injury. Quite a history is written on the south wall of that church. It tells of

the teaching by pictures by the church in the Middle Ages; of the teaching by the literal words of Scripture by the Church of the Reformation; the numberless coats of whitewash over both speak of subsequent ages of neglect and indifference; and may not the restored fabric typify the awakened Church in Cornwall of the nineteenth century.

No. 3.

Notes on the History of Truro.

The following Notes on the Early History of Truro are extracted from the *West Briton* of October 23rd, 1890.

I have read with interest your note on old Truro, and as you ask for further information relating to the town in ancient times, I send you some notes relating to its history, which, as they consist mainly of new matter, I think may be of interest to your readers.

The materials that exist for the early history of Truro are extremely scanty, but from its position at the head of the navigation it possesses advantages that must have been early recognised. It has been suggested that Ptolemy's Cenion indicates the Kenwyn river, and that Truro was at that early date the head of the district, but all tradition tells us that Tregony, and not Truro, was the haven town, and that the former decreased as the latter grew in importance. Domesday Book does not help us, but the details recorded of the western counties are not as full as those in some other parts of England. The town no doubt had its origin when the castle was built early in the twelfth century, and grew up around its walls and under its protection. This castle does not appear to have been a place of very great importance; it stood on Castle Hill, and in the early part of the present century its remains were indicated by a mound, overgrown by grass and brambles, with a deep hollow in the centre, surrounded by a wall covered with grass. In 1840, when levelling the mound to adapt it to the holding of fairs and markets, the foundations of the castle were laid bare. They were circular, about 75 feet in diameter, whilst the thickness of the walls was about 3 feet, the latter being constructed

of local slate laid without cement. This probably was the foundation of the keep, but no traces of the outer walls were found, although a small room adjoined the entrance, which was on the south-east side.

That Truro was of some importance in the early half of the twelfth century is also shown by its charter, which dates from that period. The town crept down the hill from the castle towards the quay, and thus Pydar Street was first formed. Tonkin calls this street St. Pancras Street, but I can find no evidence to support this surmise. The approaches to the town from the east were two in number; over Moresk ford, and by another paved ford, which was discovered when the foundations of the Public Rooms were put in, crossing the river, where, on the eastern bank, it has been found under the timber wharf opposite. This road ran to Tregony, and descended to Mopus by a steep worn track to the ferry, which may still be traced.

But this ford at Moresk became inconvenient as the town increased, and a bridge was thrown over the river, about a third of a mile below it, and it still exists, and bears the name of Old Bridge.

I am not aware of any record of the date at which this bridge was built; but as it is shown in a chart of the south coast of Cornwall drawn in the reign of King Henry VIII, it must have been prior to this period. Both it and the West Bridge appear in Norden's map, 1584, and in that of Baptista Boazio, dated 1597, so that we have clear evidence that both these bridges were in existence in the 16th century. The parish church was built and consecrated in 1259; and its high altar was dedicated and the church was probably enlarged in 1328. Numerous fragments of this early English church were discovered during the erection of the Cathedral, but no foundations by which its plan could have been traced were laid bare. As was very general in Cornwall, this building was pulled down in the early part of the 16th century, and St. Mary's Church then re-built, a portion of which still stands as the south aisle of the choir of the Cathedral. Truro Church was always dedicated to St. Mary, although many churches had their dedication altered at the time of the Reformation. I find that in a document of

1368 it is called Truro Church, in 1427 the Church of Truroburgh, and in 1441 the Church of the Blessed Mary (in Truroburgh).

The Dominican Friary stood between Kenwyn Street and the river; it was founded by one of the Reskymmer family, and was built in the 13th century, Bishop Bronescombe dedicating the church on Michaelmas day, 1259. About a century and a half ago, parts of the church, and of the holy well, were distinctly visible in a meadow called the Friary, but I am not aware that any remains at present exist. The site is intersected by Castle Street and Frances Street, and although I made a careful examination of the ground (accompanied by the Rev. W. Iago) some little time ago, we were unable to find any remains except a few worked stones built into walls. The church appeared by the plan of the south coast of Cornwall, *temp* Henry VIII., to have had a lofty tower with pinnacles, and it contained three bells. Thus in the 13th century Truro had grown to be a thriving town, whilst in 1339 it was the largest town in Cornwall, with the exception of Bodmin; Lostwithiel coming third.

In the time of Henry VIII. there were 131 taxpayers in Truro, and taking six persons to a house the population would be at this time about 780; and if we add to this, those exempt by reason of poverty it would bring the total population to about 1,000. At the same time there were 77 taxpayers in Tregony and 74 in Fowey, which shows how Truro was taking the lead of the former as the principal town on the Haven. At this date the wealthiest men in the town were, John Michell, Thomas Trenhals, Thomas Eva, James Trenhals, and John Gaverigan. The castle had already fallen into decay, and was "clene down," whilst the site was used for a shooting and playing place; and where Newham now stands was a wood called Newham Wood. At the time of the dissolution of the monasteries, an inventory was taken of the goods of the Friary, but these were very mean and poor; but the visitors committed to the care of Mr. Wat. Devis the Mayor, Mr. John Thomas, gentleman at arms, and Mr. John Michell, a small chest of papers and deeds, for safe custody; if this coffer is still in existence at the Town Hall its contents would be of the utmost interest.

One of the streets is called St. Nicholas Street, but I am not aware that any church existed here, though the name might have been connected with the Friary. St. Nicholas is the patron saint of sailors, and the dedication is common in churches situated on the sea shore. Pevensey Church, in Sussex, is so dedicated, and the smoke of the votive tapers, which were burnt before his image by wives whose husbands were at sea, it still fresh on the pillars, whilst at Winchelsea was a magic vane which was turned by loving hands believing it would make the favourable breeze blow and bring back the dear ones far off upon the sea; but no traditions of such a kind seem to hang about the street. In the eighteenth century Boscawen Street was divided into two by the Middle Row, which ran down the centre, and under the western half of which the old Market House was situated; one of these streets was called Powder Street, the other was a continuation of Coinage Hall Street, and may have been so called. The Middle Row was taken down about the year 1810. I know of no print or drawing representing the old row; if such exists, it should be carefully reproduced. The New or East Bridge was built between 1770 and 1780, thus improving the access to the town from the east.

I have thus jotted down a few notes that I have gleaned with reference to the history of the town, which I think may be of general interest, as for some years past I have been collecting facts for such a history, but the scantiness of the materials and other occupations have hitherto prevented me from making that progress which I had hoped to have done.

H. MICHELL WHITLEY.

No. 4.

Notes on Natural History and Botany.

The following notes on the flowers around Truro may be interesting:

White varieties of the Dove's-foot geranium—*Geranium molle*, L., and of Herb-Robert, *G. Robertianum*, L., in Malpas Road, Truro; I do not find these mentioned in Hooker's flora. Yellow musk, *Mimulus luteus*, L., banks of Kenwyn River, Truro;

Ivy-leaved campanula, *Wahlenbergia hederacea*, Reichb., Boscolla, Truro. Ciliated heath, *Erica ciliaris*, L., Truro; Viscid bartsia, *Bartsia viscosa*, L., Bastard-balm, *Melittis melissophyllum*, L., Calenick. *Pteris longifolia*, L., Kennal woods [Mr. Lidgley]. Mistletoe, *Viscum album*, L., common, gardens at Mawnan Sanctuary, [Major Parkyn]. *Ranunculus parviflorus*, L., *R. arvensis*, L., *Silene gallica*, L., *Medicago maculata*, Sibth., *Corydalis lutea*, D.C., *Barbarea praecox*, Br., *Hypericum calycinum*, L., *Trifolium subterraneum*, L., *Linaria repens*, Ait., *Bartsia viscosa*, L., *Mimulus luteus*, L., *Viscum album*, L., *Allium triquetrum*, L., Ponsanooth. *Tesdalia nudicaulis*, Br., Stithians; *Geranium striatum*, L., *G. phaeum*, L., *Erica ciliaris*, L., *E. Mediterranea*, L., *Scrophularia scorodonia*, L., *Melittis melissophyllum*, L., *Hymenophyllum Tunbridgensae*, L., Kennal Vale. *Geranium pratense*, L., Carharrack; *Oxalis corniculata*, L., Burncoose; *Utricularia vulgaris*, L., Gwennap [Mr. F. H. Davey]. Mr. Davey has kindly shewn me, on the several visits I have paid to Ponsanooth and district, most of the forms growing. I have noticed, too, several extreme cases of proliferation of the inflorescence of the Violet, *Viola canina*, L.; Ribwort, *Plantago lanceolata*, L.; and Primrose, *Primula vulgaris*, Huds.

At the Annual Meeting of the Society Mr. W. G. Earthy exhibited a young specimen of the Pomatorhine Skua (*Stercorarius pomatorhinus*, Temk.), which had been shot at Malpas, on October 24th, 1890, by Mr. Tresidder. Although probably this bird is often a visitor to Cornwall, yet precise dates of such visits are worth recording. In turning up a reference in a book given by the late Mr. W. P. Cocks, of Falmouth, to our library, I came across the following, in a letter [no date] sent to him by Mr. O. S. Dixon. "A young bird (of the above species) was shot Sept. 14th, in Truro River. In 1855 a young bird was taken alive near Budock Vean. A specimen was shot in the same year at Budock, which was an *adult* bird." This note is of especial value, as Mr. E. H. Rodd in his revised list of birds published by the Royal Institution of Cornwall, says, when speaking of this bird, that in every instance it occurs in immature plumage on our coast.

During a visit to Mr. John D. Enys, that gentleman showed me a discovery of his of the Freshwater Sponge (*Spongilla auritalis*, Lk.), in the fish-pond at Enys. It lived chiefly amongst starwort, and he dredged it in a most novel way, with a garden rake, to the handle of which he attached a long line. I brought some home alive, which died down in the winter, leaving gemmules, from these, last summer, young sponges hatched, but did not grow to a large size. In examining the water a few days ago, in the dish in which they live, exposed to the weather, for rain water is essential to their existence, I found a few gemmules, so that I fairly anticipate a second brood of *Spongilla* before long.

On the underside of the water-lilies growing abundantly in the fish-pond at Enys, we also found thriving colonies of the fresh-water polyzoon, *Plumatella repens*, L.

Some months ago I received from the Rev. W. Iago, a small box of sea-sweepings, which he had picked up at Trevone, on the north coast of Cornwall. In his letter to me he says "the tide was advancing and the waves were dashing up upon the sand and rocks, and the margin of the water showed a black line across the beach, and this line when examined revealed tens of thousands of flies, ants, beetles, &c., alive, and in the course of being drowned. This, as Mr. Iago remarks in another part of his communication, is probably the reason why in the sunk beach at Portmellin, near Mevagissey, the members of the Society saw so many insect remains, during the excursion of the Society there, in 1889.

I have carefully looked over the contents of the little box, which are interesting, as they not only point to a probable solution of the reason why so many insects are found in our submerged beaches, but are of biological importance. They point to the distribution of the animals along the coast line, for if tens of thousands were swept on to the coast, perhaps as many were destroyed at sea, or alighted elsewhere. It is the old lesson put in a new light, that thousands of organisms are destroyed to one that is successful, be it lowly plant or animal. All the insects sent are feeble fliers, small *Goodephaga*, *Brachelytra*, *Rhynchopora*, (*Apion*), *Eupoda*, (*Cassida viridis*, L.) from amongst the beetles; ants (*Formica*) from amongst the Hymenoptera; and flies (*Musca*

Cæsar, L.) from amongst the Diptera. This feebleness, and the want of some place of rest, probably explain why they were so numerous in this particular case.

On the edge of Polquick Pond, Truro, Mr. J. H. James and myself found, in 1889, the Striate Geranium, *Geranium striatum*, L.; Major Parkyn and myself found the same species at Helford, on our annual excursion it was seen by several members, Mr. Thomas Clark has seen it in several places, and Mr. Davey, of Ponsanooth, gives Perranwharf. Although in Hooker's Student's Flora, 3rd edition, it is put among the excluded species of British plants, I think in face of the above distribution, such an exclusion ought not to obtain, but that the plant should now be considered indigenous.

When on a walk last March, near Merther, I saw a female humble bee, *Bombus terrestris*, Ill., hovering over a small hole in a hedge-bank, which was overgrown with primroses. Whilst in this position a hive bee *Apis mellifica*, L., came behind it, hovering unnoticed for some seconds, at a distance of about one inch, and then very suddenly alighted on the back of the *Bombus*. By the action of the abdomen of the *Apis* it was apparent it was attempting to sting; whether successful or not I cannot judge, as the *Bombus* went off as if unhurt, and the *Apis* alighted on a primrose. I have not read anywhere of attacks of this kind.

One evening in August last I saw a specimen of the Field Slug, *Limax agrestes*, L., descending by means of a thread, from the lower part of the trunk of one of the elm trees, which overhang Comprigney Lane, Truro. The height from which it had started to reach the road was about twelve feet and seven feet of this it had already accomplished when I came across it. I thought at first it was the caterpillar of some insect, but closer examination showed, that it was a slug descending head first by means of a mucus thread. The mucus thread is secreted by a gland near the tail end, in many of the naked pulmoniferous molluscs; but this use of the secretion is new to me.

HENRY CROWTHER.

No. 5.

Church Plate.

In many churches in Cornwall several interesting chalices, and patens, are still preserved, and are well deserving notice.

The Editor would be glad to receive any notes on this subject for publication in "Notes and Queries," of the Journal.

Kindly give as far as practicable the date of the Church plate—the Hall mark—and whether of silver or pewter.

If it bear any inscription, name of donor, &c., this should be given, with any further account and description necessary.

Sketches would be very valuable.

No. 6.

The Falmouth Packets.

Mr. Arthur H. Norway is engaged in compiling a history of the Post Office Packet Service; and would be much obliged to any persons who will furnish him with information concerning the Falmouth Packets.

It is proposed to give, so far as they are now recoverable, details of all actions in which the Packets were engaged; and any letters, journals, or records, which throw light on points connected with the service would probably be of material assistance. Any such documents, if sent to Mr. Norway at "The Secretary's Office, General Post Office, London, E.C." will be most carefully preserved, and returned to their owners in the course of a few days.

No. 7.

Editor's Notice.

In future it is intended to publish the Journal early in the spring of each year.

All Papers for insertion in the Journal, and Notes and Queries, should therefore be sent to him before the 31st of December preceding, addressed to the Royal Institution, Truro.

ON SOME RECENT ARCHÆOLOGICAL DISCOVERIES IN CORNWALL.

Supplemental Note to Part I published in former number of this Journal.
(pages 185 to 202).

By Rev. W. IAGO, B.A.

In issuing the first part of this paper, certain of the plates, from unavoidable causes (partly connected with the borrowing of objects to be illustrated) could not be inserted. Some of them, (Plates 7, 8, P, R, S, Z), are given herewith; others (Plates O, Q, T, U), will follow with part II in the next number of this Journal.

The following 20 Plates belong to part I.

No. 1.—Cupped Stones,	to face page	189.
„ 2.—Rock-markings,	„	191.
„ 3.—Nanstallon-Down Urn,	„	196.
„ 4.—Harlyn-Cliff Urn,	„	200.
„ 5.— „ „ bronze, &c., relics,	„	204.
„ 6.—Camps, &c., in Cornwall,	„	210.
„ 7.—Roman Camp, East Cornwall,	„	212.
„ 8.— „ „ West Cornwall,	„	238.
Letter O.—Holed Stones of Cornwall,	„	187.
„ P.—Cupped Cromlech, Grugith,	to face plate	187.
„ Q.—Liakeard & Rialton Stones,	„ page	238.
„ R.—Roman Coins, bronze, &c., relics,	„	214.
„ S.—Celts, bronze and tin circlet,	„	216.
„ T.—Pottery, Mullers and Shovels,	„	222.
„ U.—Roman Coins, fibula, &c.,	„	224.
„ V.—Samian Ware, Tregear,	„	218.
„ W.—Pottery stamped "Lesbians f,"	„	220.
„ X.—Roman Inscription in bowl,	„	248.
„ Y.—Roman bowl, jugs, and coins,	„	252.
„ Z.—Roman Camp near Kelly Rounds,	„	231.

Plates belonging to Part II will include the Roman-Imperial and Anglo-Saxon memorials. A list of them will appear in due course.

ADDENDA.

Cup-marks on Stone (p. 189). An additional example, discovered at Grugith, by Messrs. Lukis and Borlase, is shewn in Plate P.

Antiquities near Newquay (p. 191). At Pentire (north of the Gannel), in the neighbourhood of the rock markings, a Roman bronze coin, a Sestertius (large brass) of Severus Alexander (3rd century) was found a few months ago. Legend (*obv.*) IMP. ALEXANDER PIUS AVG. (*rev.*) PROVIDENTIA AVG. S. C.

Harlyn-Cliff Barrow, &c. (p. 199). Other cliffs in Cornwall have disclosed cinerary-urn burials, in advance of the Harlyn discovery. See, for instance, C. S. Gilbert's account (survey, Vol. I. p. 192) of a similar find at Gwithian, where, in 1741, the sea had washed away a part of the cliff.

Harlyn-Cliff Urn (p. 203). The pattern around the upper portion, viz: "a band of enclosed zig-zag forming triangular compartments filled with parallel diagonals sloped 'en bloc' to right and left alternately," has been met with on an urn found in digging foundations for the Lancaster Barracks (Brit. Archæol. Asso. Journal, Vol. 33. pp. 125-6, and Plate), and a very similar design on some pottery of the ancient Lake Dwellings in Switzerland (Keller, Pl. cxvii. 15) whilst its exact effect has been produced naturally by marine vegetation in a microscopic diatom,—*Rhizosolenia Shrubsolei*. (Leis. Hour p. 533, fig b).

Harlyn Incense-Cup (p. 204). This,—unique in Cornwall as I have stated,—has perhaps its nearest companions in the Albert Memorial Museum at Exeter. There, amidst remains of Celtic Urns, I saw, in September last, two of these little Earthenware cups. They are both very similar in size, character, and style of ornamentation, to the Harlyn-Cliff specimen, especially one labeled:—

"From a barrow, Upton Pynes, Devon, 1170."

The other, more like a much-truncated cone, is described as "containing the burnt bones of a child; from a barrow on Broad Down, Farway, Devon, 1868." Both, it seems, were "excavated by Rev. R. Kirwan, M.A."

Harlyn Bronas Dagger or Knife (p. 206). Besides those mentioned, one of a similar class (with two rivet-holes for haft) was found in Par-Moor, St. Ewe, in 1757. (Borl. Antiq. 2nd Ed. p. 311, Pl. xxv.) It is now in the Ashmolean Museum at Oxford.

Harlyn Tamarisk. It is interesting to observe with regard to the rocky and sandy district of the Harlyn coast, where scarcely a tree or bush except Tamarisk will grow, that this shrub is one of the earliest named in the Bible, the passage, Genesis xxi, 33, which mentions "grove, or tree," in the authorized version, being rendered in the new translation thus:—"Abraham planted a tamarisk tree in Beer-Sheba."

Roman Fibula, &c. (pp. 222-3). Another bronze fibula, with pin, from Lanivet, and another tinner's oaken shovel, dug up at Boscarne, Bodmin, are in the Museum at Truro, and will be figured in Plate T.

Roman relics at Padstow (p. 259). I am endeavouring to obtain, locally, further illustrations of these.

Licinius's Stone at Tintagel (pp. 261-2), *Constantine's at St. Hilary, and the Stone at Hayle*:—My full account of these, after repeated inspections, I have yet to give. The lettering on the Tintagel stone is quite clear. Mr. Haverfield has lately communicated to the *Archæological Journal*, and to the *Antiquary*, my discovery and reading of it, and has confirmed my assertion as to its age and character. In his hurried visit to the stone, however, he found himself unable to decipher the third line of the inscription, his own record is therefore, in that respect, defective.

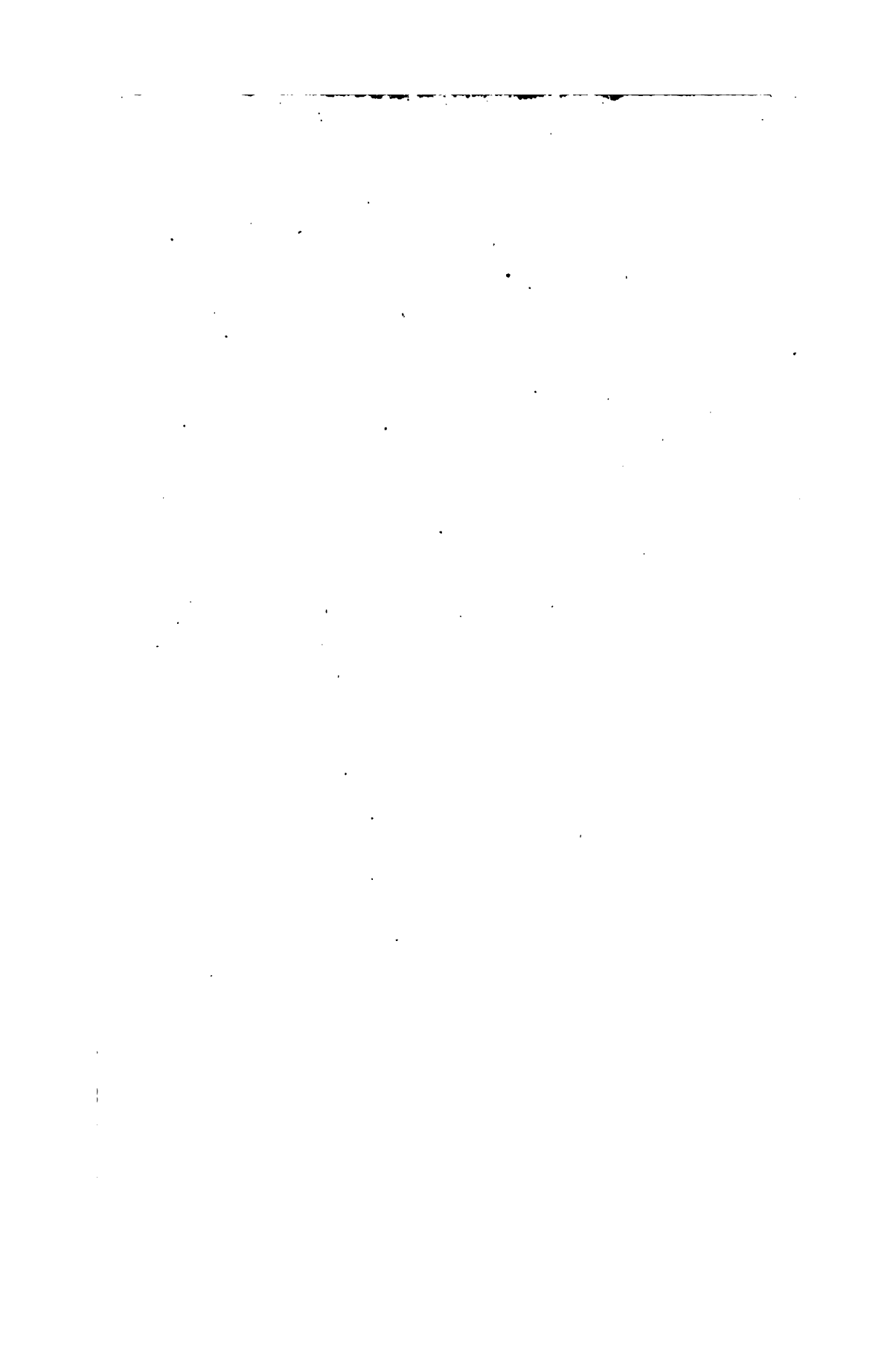
A constant pressure of professional duties and, (I regret to add), many unavoidable interruptions of my leisure, must be my apology for having inserted merely the supplemental note, above, with 6 Plates, (which I have drawn anastatically), referring to Part I of my paper, instead of supplying the conclusion—which must be a little longer deferred.

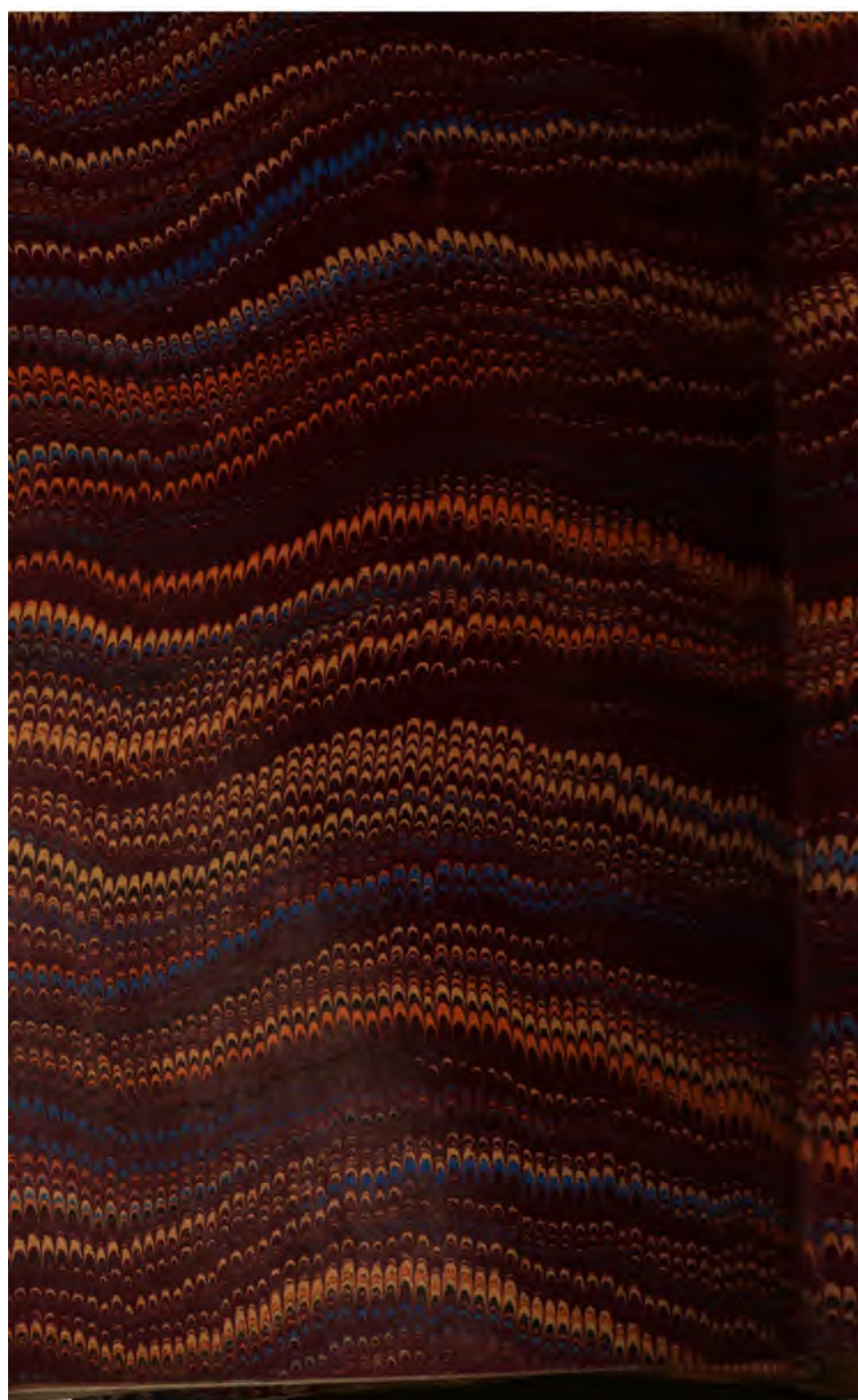
W. I.

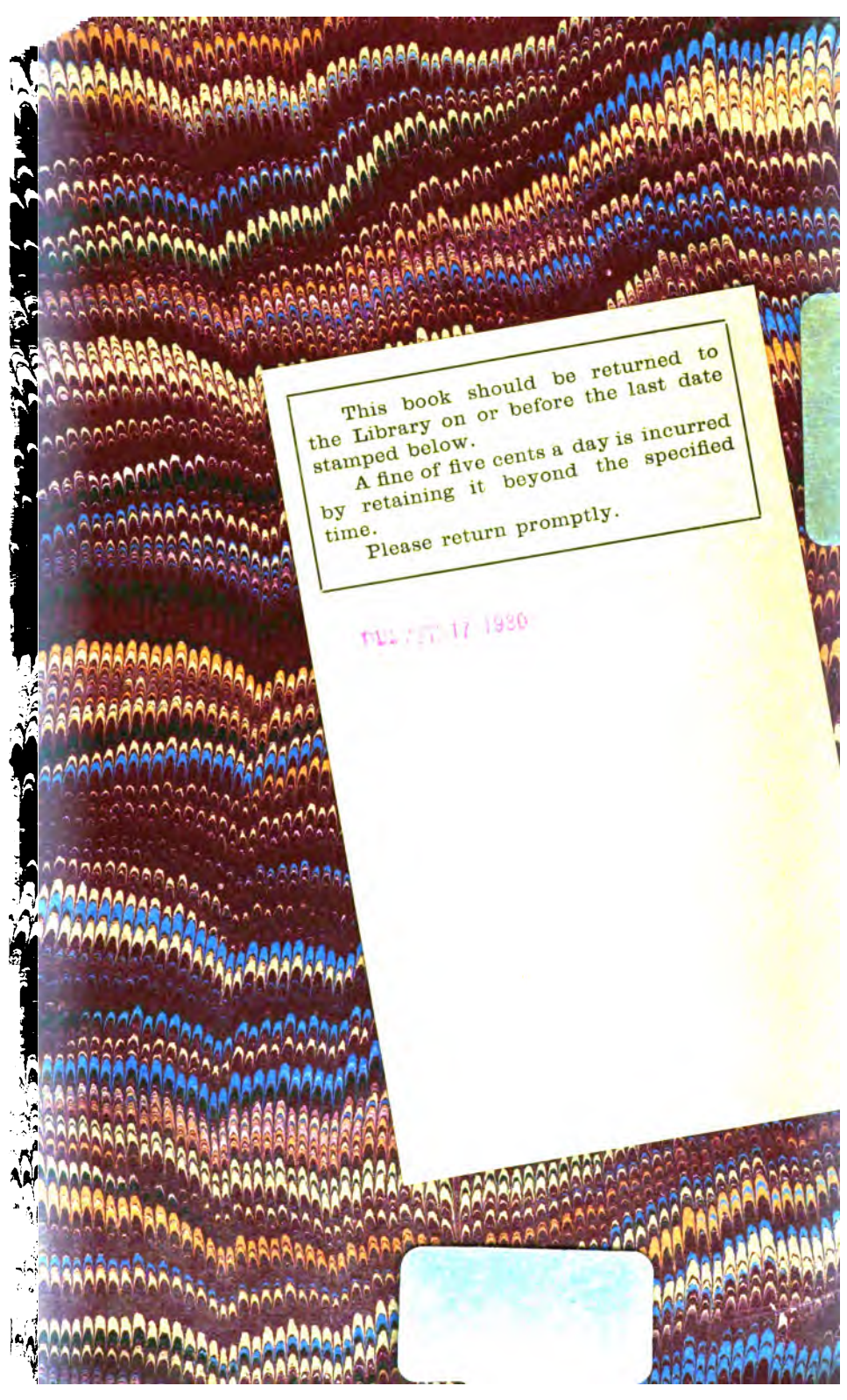
COZZEGENDA

The following typographical errors in Part I should be corrected.

Page 248,	Line 9.	for gracia,	read Gracia.
" 251,	" 16.	" as shown,	" has shown.
" 259,	note,	" etc,	" etc.
" 261,	"	" A. J. Langdon,	" A. G. Langdon.







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